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Session 20PD
They Came for AIDS, They Stayed for Liver (Laboratory Testing in Risk Selection)

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Summary: This session examines the major trends in insurance laboratory testing from 1980 to 1985, with an emphasis on why blood testing thresholds were lowered dramatically in the mid-1980s and why those thresholds will persist into the next century. The value of liver function testing will be examined as a case study in protective value. Issues to be addressed include:

- *what is the real impact of human immunodeficiency virus (HIV)-1 testing (sentinel effect)?*
- *the unique pay-offs from liver function tests*
- *clinical medicine mortality versus underwritten mortality: overcoming problems caused by different perspectives, and*
- *cotinine pays the freight?*

Mr. Richard L. Bergstrom: Perhaps the best way to introduce the topic content of this session is to introduce the speakers. The first speaker is a good friend of mine, Hank George. Hank currently works at Lab One, which affectionately used to be known as HORL. I've know Hank for a number of years. We've done a number of talks together. He is, in fact, currently a new author. He and John Krinik have co-authored a book called *Getting it Issued.* If you've ever had a hard time getting

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your field force to understand why underwriters or actuaries made a certain decision in the issue process, see Hank about a copy of his book. I am sure that he will plug that much more than I have just done. Hank has been with the insurance industry for roughly 25 years. He's worked for several insurance companies, Northwestern Mutual being the first, I believe. He also spent a year in Toronto working for Manufacturers Life. He also worked at Lincoln National prior to joining Lab One about 12–15 years ago. He's an excellent speaker. He probably gives 150 talks a year. All of us in this room may never give 150 talks, but that's Hank's job.

Our second speaker is Vera Dolan. Vera is a consulting epidemiologist. She's president of VFD Consulting, which offers research analysis to life and health insurers. She received a B.A. degree in Public Health from John Hopkins and has a masters' in epidemiology from the University of North Carolina at Chapel Hill. Before starting VFD Consulting in 1989, Vera held research positions at Lincoln National, Transamerica, Occidental, and the Kaiser Foundation Health Plan. Vera is an associate of the Academy of Life Underwriting and a contributing editor to *On the Risk* which is the journal of the Academy of Life Underwriting.

Mr. Henry C. George: Before I begin, I am duty bound to do a commercial, but not the one you expected. I am not going to talk about the book. I am going to give you a quote that I have rearranged. The quote says, "If you go where you've always gone, you'll hear what you've always heard." And the reason I say that is because I have the privilege of being chair of the first international meeting of folks worldwide interested in life and health insurance risk management. This unique event, the life of which has never existed in the known universe, will convene in Mexico City in February 1997.

To give some magnitude of this event, we had 151 delegates registered 126 days prior to the event. We have more delegates registered from Thailand than from Canada. This is going to be an international event. It's going to take place every 30 months. The second meeting is already being organized as we speak in West Sussex, England, and the third meeting will be somewhere in Pacific Asia.

In the last two decades, there has been quite an abrupt shift in where the emphasis has been placed in terms of information gathering for life, health and disability insurance underwriting. There has been a steep increase in laboratory testing. In fact, probably only the steep rise in the use of paramedicals (that is, those modified examinations done by, for the most part, nurses, as a substitute for full physician exams) probably has rivaled lab testing in terms of a tremendous increase in the last two decades.

Other requirements have declined. Most precipitously, the chest X-ray and the medical exam are not being done nearly as much as they were 29 years ago. One reason for a ten-fold increase in the amount of lab testing, is the change in testing thresholds for blood profiles. For example, in 1975 the average life insurance company had a testing threshold for blood profile of about a million dollars face amount of insurance. Today, the average company is well under the $100,000 threshold. So, there has been this huge and steep decline in the face amounts for testing. Why has this taken place; if this were a fill-in-the-blank question, I think everyone in the room would get it right. The concerns for mortality and morbidity implications of the HIV pandemic, were fueled, in no small part, by things the Society has published in the last two decades.

When we talk about laboratory testing in insurance, we're really talking about three different, separate modalities, which I'd like to describe in broad terms for you. Blood testing is the number one medium in which laboratory testing is done for insurance screening; urine is the traditional medium. We were collecting urine specimens at my alma mater, the Quiet Company, years before laboratory testing was a major issue in insurance. Finally, and most recently, there's saliva testing. We found that term had little appeal, so now we use the more sophisticated term *oral fluid*. Actually, the correct name is *mucosal transudate*, but when you say that, people leave the room. I'm going to refer to it as oral fluid. This is the newest entrant into the insurance testing derby. We'll describe all of these and Rick will be talking about protective value, which is the essence of why oral fluid is such an asset.

As far as blood chemistry is concerned, do not worry, and do not become alarmed. I am not going to begin discussing these tests one by one, or there would be an absolute migration into the hallway. Chart 1 shoes the typical profile that an insurance laboratory would provide to its clients for the screening of life insurance applicants. This is conspicuously different, I would point out, from a garden variety clinical profile. One of my administrative assistants in Kansas City has a son who had an upper respiratory infection and had some extended symptoms. They did a blood profile and she asked me to look at it. And I was struck again by how different the clinical blood profile is from the one that we do in insurance. This is very specialized. It's focused on important goals; certainly first and foremost is to identify people who are infected with the HIV-1 virus. For preferred risk purposes, we have blood lipids and diabetic markers, under the heading "blood sugar." Then, of course, is the vaunted liver enzymes, which I want to talk about a little bit more. I would say, without batting an eye, the perceived most valuable component of laboratory testing for life insurance underwriting, is the liver enzymes. That's the basic blood profile.

CHART 1
BLOOD PROFILE

LFT	KFT	PROTEINS
GGT	BUN	Total Protein
AST	Creatinine	Globulin
ALT	**BLOOD SUGAR**	Albumin
AP	Glucose	**LIPIDS**
Bilirubin	Fructosamine	Cholesterol
HIV-1		HDL-C
		LDL-C
		Triglycerides

In blood testing, we also do what the labs have come to call "reflex testing (Chart 2)." The concept here is you do the initial screening test and if something is abnormal, you do this additional test. The laboratories store the blood typically for four weeks, so you have the luxury of going back and saying, retest that specimen and run an additional test.

Basically what we have here are several tests that have enhanced sensitivity and specificity for heavy drinking—they're called alcohol markers. These are tests that are, for the most part, done only in insurance testing. Then we have the hepatitis marker for the two kinds of hepatitis that insurance companies are concerned about—Hepatitis B and C. We have another test for blood sugar of slight refinement over the screening tests. We have tests for the existence of prostate cancer. It amounts to, really, the first tumor marker that is widely endorsed as a screening test to identity people who have cancer.

Then, finally, and we'll talk about it in a moment in more detail. We have the cotinine test. Cotinine is the metabolite of the psychoactive chemical nicotine, which is the real reason why 50 million Americans smoke and can't quit.

As far as urine is concerned, it offers a somewhat more restrictive profile than blood. There are, however, some attractive components in urine screening, and its role is likely going to increase in the years ahead, as insurance companies look for lower out-of-pocket alternatives for screening. Urine testing, of course, is conspicuously less expensive than blood testing, and also offers the potential for agent collection (which, of course, blood does not).

CHART 2
BLOOD REFLEX TESTING

ALCOHOL	**HYPERGLYCEMIA**
HAA CDT	Glycohemoglobin
	PROSTATE CANCER
HEPATITIS	PSA
HBsAG	Free PSA
anti-HCV	**COTININE**

In the urine profile, the thing that is most appealing is the cotinine screen, which, I would argue, when all things are considered may be the most valuable part of laboratory testing. The reason for that is because a certain number of people who apply for insurance inexorably develop a very temporary type of amnesia when questioned about tobacco proclivities. Smokers' amnesia may be the most common temporary neurologic impairment in the world. People forget they smoke at opportune times, like during paramedical examinations, when nonmedicals are executed. That's a serious offense, when you consider the difference in mortality between someone who is a tobacco user versus a tobacco abstainer. This becomes a very important part of testing, as do tests for illicit drugs.

Most labs offer a variety of drug screening test alternatives; the most prominent test is for cocaine use detection. Virtually all urinalyses performed at my lab for insurance clients will include a screen for cocaine. We have also gone into testing other drugs, especially now that there's a lot of rhetoric about the heroine and the methamphetamine epidemics becoming substantial and affecting a spectrum of potential insurance buyers. So we do have the technology to do this, but for now, most of the drug screening is focused on cocaine.

Finally, we have oral fluid. On the oral fluid protocol, there are three test options. First is screening and confirming for HIV. We can do it all on oral fluid without having to get a blood sample. Cocaine and cotinine can both be done on oral fluid. This is an attractive method of testing, with its modified little toothbrush collection device that's generally rubbed on the upper or lower alveolar ridge, on the gum line, and then placed in the bottle. The stick breaks off, you place it in the bottle and you mail it; very tasteful and very comfortable. You can teach almost any

insurance agent how to do this collection. There's a substantial savings in acquisition costs to have the specimen collected by the producer.

As far as the relative value of the various tests I would have to give the nod either to cotinine or to liver testing. I had hoped that I would be able to spend a lot of time talking about the efficacy of liver function testing. As someone who writes and speaks on it every week of my life, I think it offers perhaps more value to insurance companies than almost any other aspect of what we do in terms of screening risks. There are the five liver components on the blood profile. The one that is the most prized is gamma-glutamyltransferase (GGT), which we'll talk about in a moment.

A survey was done by a group that surveys life insurance companies periodically—a committee of our associations. It asked a large group of life and disability companies: What percentage of life insurance applications do you take adverse action on because of liver test elevations? The answer was 2.13%. I think that's a very important number. I willing to make an inference, subject to criticism from anyone in the room who is more knowledgeable. I would say that if 2.13% of all life insurance applications are altered in terms of underwriting outcome by liver enzymes, then probably the only other medical factor that has an equal impact would be blood pressure. And I do not know how much greater the blood pressure impact would be. It could be that liver enzymes are either the most important or, at the least, the second most important cause of adverse underwriting decisions, which is part of my argument about their value.

A dear friend of mine, the co-author of *Getting It Issued* and a consultant extraordinaire within the insurance community, John J. Krinik of Binghamton, New York, made this comment in his publication. I think this testifies to the perception within the insurance underwriting community. He said, "It seems to me that underwriters are well advised to treat abnormal liver enzyme results conservatively . . . no matter how loudly applicants or attending physicians protest." I think that's really what happens. I think underwriters view these as valuable, use them in a judicious manner, and unearth all sorts of things that would have been obscured to them in the past.

This is probably, from a laboratory science point of view in this industry, the most prized sentence ever uttered from the podium in any underwriting meeting in history. I'll set the scene for you. It was said by my old boss from Northwestern Mutual, who's now retired, Jerry Moorbeck. At that time, Jerry was the head of a group of people we called the large risk consultants. I tutored in underwriting under Jerry, back in the 1970s. In 1987 at the National Underwriting meeting of the Home Office Life Underwriters Association (HOLUA), which was in New Orleans that year, Jerry got up to the podium on the last day as part of a panel, and

this is the only thing ever said publicly at any meeting I've attended about an unpublished protective value study, that was done at Northwestern Mutual Life. In fact, I and a retired actuary, Bill Chambers, worked with Jerry on this study. Of course, I got all the dirty work because I was the lowest ranked. We looked at thousands of cases that had been blood tested in the immediate few years prior to the report. I think the cases were done in 1984–85. These cases were all screened with blood profiles that did not included HIV testing. It was before the introduction of HIV testing. In those thousands of cases, the protected value was said to be a $36 return for every dollar of out-of-pocket cost, which, obviously, was a staggering return. I wish Jerry had spoken for the next half hour on the rest of the results of the study. I do remember one fact that Jerry didn't give us. That is, the single most valuable test in that study, by a substantial margin, was the GGT.

So let's talk about this test. What is this entity that I am speaking of? It's a liver function screening test that paradoxically is not used very much in clinical chemistry. If you went to a physician for a routine physical exam and they did a blood profile, the odds are they wouldn't even do this test. If they did it, they would ignore the result if it were an isolated finding. The chief reason for this, from a clinical point of view, is there isn't much interest in identifying abusive drinking until the patient either reeks of alcohol, has a car accident, or comes in seeking counsel for the alcohol problem. The nice thing about GGT, from an insurance point of view, is that it has the highest sensitivity to occult (that is undeclared) heavy drinking of any screening test I have ever seen. That sensitivity, depending on the study you look at, is somewhere in the 50–60% range, which is excellent.

It has also been linked in other studies (from Scandinavia and Australia) to excess mortality (EM). That EM, associated with persistently abnormal GGT, has not just been confined to alcohol-related causes of death, but extends to cardiac conditions where many of you know, there is a wellness literature that says that alcohol is cardioprotective. GGT has been linked to early and significant mortality in several studies that have been published over the years in clinical medicine.

The last thing I want to talk about is this issue of HIV home collection. You know the Food and Drug Administration (FDA) has approved HIV home collection, not "home testing." They shouldn't use that phrase. Home testing is when you test your own sample as people do for sugar in the urine. This is "home collection." You stick your finger and collect a blood sample, which is sent to a lab. Then you call in and give them a totally anonymous number and then you find out if you have HIV. This particular test has two versions. There's one called Confide, which is from a Johnson & Johnson subsidiary, and there's another one called Home Access.

In a recent *USA Today*, it was said that these tests had started slowly, but were now picking up momentum. Wall Street analysts project $100 million in revenue per year within the next four years for these tests, which would suggest a substantial number of people will be tested. If even a fraction of that number turns out to be infected and if only a fraction of that group should develop a period of , shall we say, "HIV amnesia," then we're on the threshold of the biggest antiselective assault against the life insurance industry that has ever taken place in history.

Sometimes people say to me, when I speak, that they doubt that there will be much antiselection from HIV positives in the years ahead. They deride these comments as being scare tactics. My administrative assistants in Milwaukee and Kansas City are proficient on the Internet and they have been cruising for me and pulling things up to call to my attention. I found this one rather entertaining. On March 1, my assistant Esther showed me a little ditty that appeared on the Net that began "Contrary to popular wisdom, it is sometimes possible for HIV-positive persons to secure life insurance." After that, it was basically a primer on antiselection. I've heard that somewhere on the World Wide Web are the decennial "age and amount" thresholds used by life insurance companies for screening for HIV.

The bottom line is, there is going to be antiselection. I wouldn't be surprised if we had as many as 400,000 or 600,000 HIV-infected potential insurance buyers, who will enter the market when they know they're infected.

Who's most vulnerable? Well if you read the Internet entry I just showed you and read the rest of the text, the advice is, if you belong to any association through which you have access to nonunderwritten or minimally underwritten insurance, use that first. Or, join an association for the purpose of accessing its insurance program. The second piece of advice is use direct mail and other delivery systems that exclude agents. It's always easier to put down misinformation on a sheet of paper than to tell someone face to face. So I think these particular distribution systems are vulnerable. It may be paradoxical that some group carriers have higher HIV screening limits than we do in traditional life companies.

Obviously, HIV testing limits are going to come down. We've seen a fair amount of activity in that area just in the last few months. There are three options. Rick is going to say something about protected values, especially with regard to urine and oral fluid. Let me just give you a quick overview. Blood has the implied major advantage of maximizing protected value. There's no doubt in my mind that a blood profile would give you more payback for the dollar than oral fluid or urine. The drawback is you have to collect the blood sample, and as much as I trust producers, I don't think I want them sticking needles in people! Urine has the advantage of being agent collectible, but it is not saliva. Number two, the urine has

the advantage of having a valuable profile. Oral fluid has a very limited profile, which one would argue is its principle drawback. But balanced against that, it is very user friendly. Several major Canadian companies, Crown Life and London Life and more recently, State Farm Life in the U.S., have reported exceptional results on agent collection, in terms of the field force's ability to do it and in terms of the field force's attitude toward the process.

Dr. Sandy Lowden of Crown Life said that they projected that 6% of smokers would have smokers' amnesia. It turned out to be 14%. Imagine if 14% of people who use tobacco, most of them cigarette smokers, were to materially misrepresent their status and come in *four or more* tables under their true mortality. Also suppose you were to blindly accept them as nonsmokers. I suspect that might have a staggering effect on the mortality of that block of business.

Will mandatory lower screening limits for HIV mean higher blood thresholds? There are people who say yes and people who say no. The yes argument says that if we have to drop screening from $100,000 to $50,000 or $25,000 or as some companies are doing now, to all new insurance, that's going to cost a substantial amount of money. So the only way to balance that is to move up the blood test limits.

There are, however, substantial arguments to look elsewhere for the funds. Look at your remaining worthless chest X-rays. Look at stress tests. Look at electrocardiograms. Look at medical exam limits. Look at your other requirements carefully, and ask yourself, am I throwing out the baby with the bathwater by raising blood limits?

My great concern is that we'll lose the enormous protected value of the blood profile, while preserving tests with only a fraction of their value. If we lose the blood profile, our existing pricing assumptions will be invalid. I know a number of reinsurers are grievously concerned about a trend developing; at least one has sent out a notice to automatic reinsurance clients, saying don't even think about raising your blood testing thresholds unless you want to have your reinsurance repriced. In the preferred risk arena, probably nothing we have, other than maybe the medical history itself, contributes as much to preferred risk underwriting as do blood test components.

I think there are substantial arguments against not raising blood testing limits. I hope companies will not move in a helter skelter fashion and wind up literally throwing out the baby with the bathwater. There are better solutions. One is to maximize the amount of inexpensive testing by eliminating what some companies are saying is well over a $30 per applicant surcharge for specimen collection. That

can be eliminated through agent collections. There are some arguments about agent collection. I have fended them all off.

At a recent national underwriting meeting, I did a vignette on a subject similar to this, and I ended with a discussion of agent collection. I was challenged by a representative of a paramedical firm, who denounced agent collection and made comments about how this would become the Achilles heel of the insurance business, because all the producers would be motivated to substitute or to have surrogate donors. I strongly urge you that is nonsense. Look at the experience of State Farm, London Life and Crown Life. Look at the era in which we live. We're in a market conduct era. Agents and brokers will not tamper with oral fluid tests. Agent collection will work. Its savings are huge, and in my mind, it is irresistible. With that, I will now turn the podium over to Ms. Dolan.

Ms. Vera Dolan: I'm about to do a little role playing to dramatize a hypothetical interchange about lab tests between you, the actuary and me, your chief underwriter. The place is your office, and the time is this Friday. You are at your desk minding your own business, reading the latest report on mergers and acquisitions, when in rushes your chief underwriter, me, out of breath and all excited. I say, "I just had lunch with Hank George, you've got to listen to this! All our requirements are out of date, and we've got to make a lot of changes. I can't do this by myself. I really need your support to do this. Please give me some time to sit down and explain this to you." So you think to yourself, "Well the chief underwriter is a solid type and not often given to overstatement, she looks pretty worked up right now. Underwriting has never been my greatest interest, but they asked me to do the oversight of underwriting a couple of months ago, so I guess I better pay attention to this. I'm curious to see what the excitement is all about, and I'll probably learn something interesting, but I've got a company to run, and I don't want to start a precedent of having to get dragged into every petty thing that underwriting comes up with." Then you, the actuary, point to the chair and say to me, your chief underwriter, "Have a seat. I've got a little free time now. There are some things I want to know about this, but I'd like you to come right to the point on all of them. What I want to know is, why should I care about lab tests and where does this stuff come from?"

Speaking as the chief underwriter to the actuary overseeing the performance of the underwriting department, you need to be concerned with major structural change in the approaches taken to evaluate mortality risk. One of the most growing sources of information about an applicant is laboratory testing. As you may have heard, laboratory testing as a dedicated investment by insurers did not become widespread until the advent of the HIV pandemic in the early 1980s. Getting the most out of

that investment has been an ongoing challenge since then, and much progress has been made.

Where does our information about an applicant's mortality risk come from? The primary source, the application's part II and exam originates from the applicant's own knowledge, which will be more or less complete, and more or less honest. Other sources of mortality risk information, the Medical Information Bureau (MIB) report and the attending physician's statements, still fundamentally drive from the applicant's own knowledge and willingness to disclose. Lab tests are performed independently of any information disclosed by the applicant. They are objective with regard to any information conveyed by the applicant, and they are performed by a third party that is disinterested in the specific outcome of the test. Each test is verifiable because it can be replicated to the extent that any certified laboratory, performing the same test on the same sample, will get the same result.

Many of the laboratory tests that are commonly part of the panel used in this selection are there because they can reflect unhealthy physical states that have been sustained for a long time or cause cumulative life threatening damage. For example, the level of GGT, a liver enzyme in the blood, does not wildly fluctuate up and down every day, but gradually rises and falls over weeks depending on what is going on in the body. Many of the things that make GGT rise have underwriting significance. Most of these disorders are not conditions that occur overnight, but are processes that take weeks, months, and even years to develop. The same thing goes for the alcohol markers, the carbohydrate deficient transferrin (CDT) and haemoglobin associated acetaldehyde (HAA). The studies that establish CDT and HAA as useful markers found that they reflect drinking that is especially heavy and sustained over many days. The reliable assessment of long-term fundamental mortality risks, which the underwriter needs, is a primary consideration for choosing which laboratory test is included as part of the application screen.

Having information that is independent, objective, verifiable, and that reflects cumulative damage to the body can confirm statements made by the applicant or attending physician, or stimulate more inquiry if no corroboration has been made.

In the case of GGT, this test is commonly available to the public, even though, as Hank mentioned, it may not be part of the route screen that the patient may get. But if an applicant is sophisticated enough about a personal health condition that raises the blood level of GGT, that applicant would be at an advantage if an insurer did not test for that enzyme. Moreover, alcohol abuse is notorious for its denial among its victims. There will always be an advantage given to an applicant who is aware of personal overconsumption of alcohol when there is no independent corroboration of that condition available to an insurer. These are situations in

which the availability of lab test results can help an insurer minimize the risk of antiselection.

As an actuary, you therefore should care very much about the impact that laboratory testing has on your selection. There are costs and benefits to the purchase and use of that information, which you may be willing to lump in with the general cost of doing underwriting, but if this is the way you ignore how underwriting is done, you do so at your peril. Risk selection has never been a black box to those who perform it. Each piece of information considered or disregarded has its own cost and bonfire. As long as the profitability of each product must include the effect of underwriting, you must know what goes into it. Lab testing is now a crucial part of this selection. You have to understand at least the basic essentials to plan and predict how our bottom line will be affected.

Where does this stuff come from? There is a constant lively interchange among underwriters and medical directors about the latest advances in medical knowledge in our respective professional meetings and within the trade journals. Around the world, these insurance professionals make it their business to know what will be brought to the door by applicants. They are proactively prepared to understand and act appropriately. I am absolutely sure that our medical director would be very pleased to start sharing this kind of information with you, should you decide to take an interest in it. I know I would be very happy to share this information with you.

For at least a century or two, medicine has been considered part of the sciences and medical practitioners generally follow the same rules as scientists. The fundamental approach of establishing a paradigm, and then relying on it until it no longer works, remains as true in medicine as it does in any of the other sciences. Discoveries in medicine are subject to peer review, replication by other researchers, and subsequent integration with all the other pieces of information similarly gained.

There are literally millions of people engaged in the practice of medicine and medical research all over the world. Every day, each of them in some way is contributing to increasing and refining this body of knowledge. The legacy of these efforts are recorded and communicated through journals, articles, meetings, textbooks, lectures, tutorials, videos, and CD-ROMs.

When considering how advances in medical science are made, think about how discoveries are made in actuarial science. Don't they often arise in response to a new set of product requirements or when a new problem has to be solved? This happens in medicine, as well. Sometimes it is an alert and caring physician, who has the opportunity to treat a patient or many similar patients who do not respond to what established medical practice offers. In the case of laboratory tests,

something that may be known to work well in detecting a problem in one organ system, may turn out to be a new tool in detecting a problem in a related system. Advances in the understanding of a disease process can point to a test that previously had no perceived utility or importance.

The subsequent invention or use of a new treatment or test is then considered a natural experiment. It is natural because the clinical situation occurred naturally, and not artificially. It is an experiment because the new treatment or test used is not yet a validated procedure, or a conventionally accepted medical practice. Regardless of the benefits immediately gained by those patients who received the new treatment or test, it is a cultural tradition and a professional obligation for the practicing physician to communicate the results of that work for the benefit of similar patients in the future.

Although the process of gaining new knowledge in medicine is similar to other kinds of science, what makes medical science different from others is that it deals with the seriousness of life and death. In the U.S., there are many state and federal laws and administrative rules that strictly govern permissible clinical practice and behavior, while still allowing for legitimate natural experiments to reasonably continue. When the new information is considered sufficiently valuable, the validation of that information gained through these natural experiments is done by the process known as the clinical trial. This is a formal experiment deliberately set up and conducted with the express intent of confirming or denying the knowledge implied from the observations made in natural experiments. Typically, these are very expensive propositions to administer and run. When done using public resources, they are subjected to intense scrutiny. Approval for the licensing and use of drugs and lab tests in the U.S. by the FDA is always contingent upon the successful completion of stringent clinical trials that validate the intended use of these drugs and tests.

The structure of clinical trials usually involves the comparison of two or more groups of experimental and control patients. Note that we are talking about patients, not healthy people. Not every medical institution has the ability to run a clinical trial; most clinical trials are run by university centers or renowned private institutions like the Mayo Clinic. Patients who participate in clinical trials are those treated at these special institutions, so they may or may not be representative of patients with similar illnesses throughout the rest of the population.

In a clinical trial, the experimented upon group or groups would consist of those patients exposed to the new test, drug, or procedure being evaluated. The control group or groups of patients are treated or tested using the established clinical paradigm. In all other ways, the experiment and control patients should be the

same with respect to demographics and severity of medical or physical conditions. The outcome of this trial will determine if the new knowledge should be further considered for inclusion into established medical practice.

Life and health insurers are extremely interested in the outcomes of large and significant clinical trials, because these trials anticipate changes in medical practice in general, and may indicate the future medical risk of an applicant in particular. Trials that involve hundreds of patients and take place over many years of follow-up are usually the only sources of information from which the life expectancy of people with impaired risks, such as strokes, heart disease and cancer, can be calculated. The results of the clinical trial can determine whether a new laboratory test is better or more reliable than the one currently accepted in medical practice. The use of such a new test can change the underwriting of an applicant radically from what it may have been only a year previous. The decision of whether or not a drug treatment or surgical procedure is insurable often rests on the certainty provided by the latest results of an ongoing clinical trial. There may occasionally be disputes between an insurer and attending physician as to the quality of that certainty. This is another reason why medical directors and underwriters are so keen to keep abreast of new information in medicine.

Beyond clinical trials, another major source of medical information is known as the population study. After the dawn of the computer age, the tracking of large numbers of people became feasible for researchers and not only governments that were intent on collecting taxes. The establishment of such studies are a relatively new means for conducting experiments in the so-called population laboratory. The appeal of these studies is that you never know what you may turn up as a result of comparing one large group of people, who are still healthy after many years of follow-up, to another group of people from the same population, who end up ill or dead.

Taken as individuals, each of these people may have appeared to have been the same to an attending physician. Without the benefit of comparing large numbers of people over time, real differences may have been overlooked when these differences are too complex or too subtle to see in a clinical setting.

Some of the population studies that have been conducted over the last 30 years, are still ongoing and involve volunteers. There are several very large groups of physicians and nurses who have been willing over the years to submit to physical exams, tests and questionnaires. Sometimes the populations being studied involve whole towns, such as Framingham, Massachusetts, Bogalusa, Louisiana, and Malmö, Sweden. A government or other medical authority tracks and analyzes cohorts of individuals living in these towns, with the participants' willingness and

informed consent. Sometimes a population study involves a large organization, such as General Electric Company or the U.S. Army, or large managed health care plans, such as Kaiser Permanente.

What these population studies have in common is an ability to see how a physical state or test result in one year has consequences on health and mortality many years later. This is done by having a large set of personal questions, tests and measurements collected when a healthy individual enters the study, and subjecting that individual to periodic follow-up and medical evaluation. Whenever that individual is seen for medical treatment or dies, this information is noted in the study records. Such information gathering may be elicited specifically for the study if it is a stand-alone investigation; or it may be gathered as a natural consequence of the relationship of the individual with the centralized medical authority, employer or health plan.

Having thousands of people in a population study contributes to increasing the validity of the study results because many interfering effects can be statistically adjusted and controlled. This statistical adjustment may not be possible in a clinical trial that consists of only hundreds of patients. It is from large population studies that the relationships of smoking to lung cancer, physical activity to heart attacks, cholesterol to heart disease, and blood pressure to stroke, to name just a few, were substantiated. The life insurance industry itself contributes to the medical field with its own population studies in the form of intercompany studies performed by the SOA. The relationship of build and blood pressure to mortality is taken as an established fact by the medical community through our 1959 and 1979 *Build and Blood Pressure Studies*. The weight tables put out by the Metropolitan Life Insurance Company are a gold standard for physicians when recommending the weight that should be maintained by their patients.

Although the benefit of clinical trials and population studies come from casting light on a new tool, truth or relationship between health and disease, the application of such tools, truths and relationships should never go directly into underwriting guidelines without first considering how the study participants are different from an insured population. This problem involves the selection bias which distinguishes who applies for insurance from who is in the general population, and who participates in medical studies. Screening, interpreting, and translating the results of medical studies for risk selection purposes must be done or else the new information will introduce greater error into risk selection than would have been present by not using it.

As I previously mentioned, clinical trials compare sick people to each other. Many trial results can be hailed as successes because they achieve gains in their patient's

life expectancy—patients who still would be considered uninsurable by insurers. Population studies would be better than clinical studies in reflecting the true prevalence in distribution of an impairment among insurance applicants. However, population studies may not share the same demographic and socioeconomic profiles that are found among insurance applicants. The distribution of populations within these profiles does affect the prevalence and severity of impairments. And thus, they affect our estimates of anticipated risk. In impairments, anticipated prevalence and severity fundamentally influences our expectation as a lab test performance, because these form the basis of the measures used to evaluate the test cost and benefit. You therefore must understand that what is published in the medical literature is oriented towards medical practitioners. It takes care of their needs and reflects who walks in their door, not ours.

As a result, we insurance professionals have to carefully pick and choose which clinical and population studies are and are not useful for our purposes. After that, we have to carefully separate the qualitative information that is useful from the quantitative information that is not. We may have to follow-up that information with our studies to truly understand how to apply this information to make it work for us.

For example, the clinical studies on alcohol markers examine the markers' ability to evaluate the severity of drinking and detect possible relapses among alcoholics undergoing treatment. These studies are based on alcoholics who are so severely impaired by their addiction that they were hospitalized and put into intensive counseling centers. However, the prospect of new lab tests that can be reliably used to screen insurance applicants for alcohol abuse, especially if they are better than the old screening methods, is so attractive that a great deal of research is now underway within the insurance industry to convert this knowledge to practical use. The qualitative information that CDT and HAA are useful as markers for alcohol abuse is currently being pursued further by each insurance lab vendor and many insurers. They are following this lead to find the right testing parameters that are appropriate for a completely different population that is much healthier than that found in alcohol treatment centers.

Another useful lead provided from the medical literature that can improve insurance risk selection is from recently published long-term follow-up population studies, which include test results for GGT. These studies are of British, Swedish and Japanese origin. From these studies, there is growing evidence that elevated levels of GGT can anticipate higher rates of early mortality associated with heart disease many years later. It appears that obesity also plays a role in the excess risk involved. The clues from these recent studies are alerting risk selection professionals to a relationship that can be used in future underwriting guidance.

What remains to be done is the conversion of this information into a form useful for the risk selection process.

One way to close the gap between what is drawn from the medical literature and what we can apply to risk selection is for us to increase the frequency and effectiveness of investigations into our policyholders' experience. The goal of these investigations is to quantify the actual performance of particular risk selection practices, like lab tests. These are done with protective value studies, which require resources already available to us from our own policy record systems. I would like us both, you the actuary and me the underwriter, to take the time to learn more about protective value studies and what they can do for us. The overwhelming benefit from doing these protective value studies is our consequent ability to take the very best from the medical field and integrate this information correctly into our risk selection practices. We will never be sorry that we made these efforts to do so.

Mr. Bergstrom: What you are going to hear in my presentation is actually a compilation of about four different talks that I've given over the last year. I often speak about underwriting-type topics. I think protective value study is probably one of the most useful analytical tools that the actuaries and underwriters have at their disposal to quantify what you just heard the other two speakers say. You just heard underwriters from the standpoint of a clinical perspective, from a medical perspective, from a epidemiological perspective, and from an underwriting perspective. You're now going to hear a portion of it from the actuarial perspective.

For those of you who have seen these types of studies, or heard these types of talks, my guess is that you probably will have forgotten most of them anyway, so I think we're all probably starting from the same basis here. And I will not have a lot of time to go through much of the theory. I also have a couple of other comments to make on the home HIV test.

The basis of a protective value study is to answer the question, will I spend more than I save? A protective value study is a process that attempts to quantify the difference in mortality. This is important and identifiable exclusively by the use of a specific screening device. It then compares this expected mortality savings to the cost of the test or the cost of the tool. If you want to look at it in the form of an inequality this is what it looks like: Cost $\leq$ Present Value of Mortality Savings Think of the left-hand portion of that in a quality as the cost of a test which is taken at time zero, at time of application, and the right-hand side is the present value of the expected mortality savings that you will have identified from this test and exclusively by this test. Equate the two. What you're really looking for is the ratio of the "cost" to the "present value of savings per thousand," and that ratio

determines what we call "the break-even threshold" as far as the protective value of the test.

Examples of cost would look like this. What Hank and Vera talked about were essentially the laboratory testing: blood, urine, saliva, or oral fluid if you will. But frankly, you can do protective value studies on any of the underwriting tools that you choose to look at: attending physician's statements (APSs), motor vehicle records (MVRs), personal history interviews, electrocardiograms (EKGs), paramedicals. Anything that is used as a screening device can have a protective value study performed on it. I should also point out that when we define the word "cost," it may not be simply the hard dollar cost of the test itself. You may want to include some allocation or allotment—I'll call them soft-dollar costs—for your underwriter's time to analyze and interpret some of this information. So, at a minimum, you need the hard dollar costs; you may also want to include some soft-dollar costs.

So that was the left side of the equation. Now let's discuss the right side of the equation. What is savings? Savings empirically is very simple: $(EM) \times R \times S \times T$. That is as simple as it gets; however, it does become a little more complicated when we look at what those individual pieces mean. EM stands for excess mortality. *R* stands for the prevalence of impairments. How many people have the impairment that we're trying to identify? What percentage of people are we going to uncover? *S* stands for the sensitivity, the ability of the test that you're using to actually identify the impairment. How good is it? The blood tests are very good at identifying people who are HIV positive. That would indicate a value close to one. Yet *R* is very low for HIV positive individuals. The variable *T*, which is oftentimes referred to as the attribution ratio, can be a little bit subjective. It's the ability of that specific test to exclusively identify the mortality that you're looking for. In other words, for HIV, the value of *T* would be fairly close to one because if you ask somebody, "Are you HIV positive?" they're likely to say. "No." Right? So how else do you find out? If someone has high cholesterol, and you ask them if they have high cholesterol, or a history of it, they may say yes. In fact, most of them may say yes. If that is the case, you can't give a value of *T* something close to one because you have other ways of finding out about high cholesterol from the insurance application or from the APS form. Therefore, you have to knock down the value of *T* to something less than one, because you're looking for only those areas where an impairment can be exclusively identified by the test in question.

Now back to EM; it is the difference in mortality between the substandard mortality that we're trying to identify due to the impairment and our estimate of the standard mortality. What makes up EM? It can be expressed as a function of standard mortality; that's no surprise. We don't know how to quantify it exactly. There are

ranges in which we need to quantify this. There is no absolute one right number. In fact, you should, whenever doing a protective value study, look at ranges. Look at a number of alternative values.

EM is also a function of some predetermined interest rate. We need that because we're talking about present values. Eight percent is a likely number that many companies use. I've seen other companies use larger values. In any event, don't use zero if you need something there. EM is also a function of persistency, because even people who are impaired may not keep the policy forever. Also consider the length of the study period, which should not go too far out, because oftentimes impaired risk mortality actually will grade towards standard mortality in the later years anyway. I would not use something longer than 20 years for doing any study, and likely something less than that could be appropriate for certain impairments.

One of the other important things that I want to introduce you to is something that can be rather subjective, but very important, and it's called the sentinel effect. How many of you know what that is? More than I thought! I'll go through this fairly quickly then. The sentinel effect is the concept of individuals deferring from applying for coverage, or causing them to apply for coverage below amounts that are tested. And the concern, of course, is that if they apply for something and they get caught, and their impairment gets disclosed, we will rate them or decline them. So if we have a test or tests that applicants know we will give to them, the sentinel effect works because those that we actually do test and catch will be fewer than those that we otherwise would have let through as standard, had we not performed the test.

In other words, it's what I consider a surrogate estimate of what the real prevalence and this is the important part of an impairment is in the insurance buying population. Not necessarily the "general" population, because not everybody will apply for insurance. However, this can also actually be larger than in the general population. For example, people who are HIV positive may want insurance more than what prevalence in the general population would indicate. And we'll look at some numbers later on that supports this.

The sentinel effect is important. People don't always know they have an impairment. If they don't know they have high blood pressure, then the sentinel effect is probably worth nothing extra because there's no way that they can selectively antiselect against you because they don't know they have it.

Does the sentinel effect have value? Absolutely. There's no question about it, and here's why. For business that is tested, using a test that we know we will uncover impairments, applicants are caught when the impairment is exposed. If we issue

them a policy, it would be a rated policy so there's extra premium that we get to offset the extra mortality. In theory, the two should average out: extra mortality, extra premium. So there's certainly a value there. For people who get tested but do not take the policy, for whatever reason, but typically because they might go to another company to find out if they can get coverage without being tested, I still say there's value. There's certainly a cost because we found out about the impairment. But I also say there is an implicit mortality savings, the reason is because we did not issue the policy to the substandard applicant as a standard.

For those who simply don't apply for coverage because they know they will be caught because we have the test, there's no cost and there's no savings.

I will also say the value of the sentinel effect increases the more aware the applicants are that testing will disclose their impairments. The more conscious they are that they know that we know how to do it—the higher the value of the sentinel effect.

I now want to go through some numbers, and one way to do that is to look at a specific test. What I want to go through now is the protective value of urine testing, which Harry Woodman has just published in the latest issue of *On the Risk*. Harry spent many years at New York Life in charge of the underwriting department. He's an actuary. He has been retired for a number of years now, but is still very active in the underwriting community. He has just published his version of the protective value of urine testing. Basic urine testing can identify the following impairments or abuses: marijuana, amphetamines, methamphetamine, and opiates.

Harry has defined three levels of urine testing. The first is what is called basic urine, which identifies HIV, cocaine, cotinine, and certain medications. The second level identifies basic marijuana. The third level finds other drugs. Of course, there are additional costs to do different levels of testing. What Harry has assumed is that the basic urine profile costs $30. When you add marijuana, there is an additional $3 charge. Then we add the balance of the drugs, there's an additional $15 to test for these.

Harry also received information from one of the laboratories as to geographical prevalence. Prevalence for certain things does vary by geography. It can also vary by age, by sex, or other things. HIV certainly varies by geography. Smoking doesn't tend to vary too much by geography. Cocaine use does vary by state. Harry looked at prevalence within high-risk, medium-risk, and low-risk states. I'm not sure how they defined them. There may have been a natural break in the prevalence rates, I don't know. In any event, when you look at those test costs that I just showed you and this is for the $30 test these are the protective values for basic urine.

Harry's estimates and assumptions led him to conclude the present value of mortality savings when divided into $30, gave you the numbers in Table 1. Now what this means is that, in the high-risk states, when you do the basic urine test, your break-even threshold is less than $10,000 (Table 2). Does that surprise anyone? What are we testing at these days? One hundred thousand? Drop to the medium-risk states. We're still under $25,000 and that's just basic urine.

TABLE 1
BREAKEVEN THRESHOLDS ($30)

Age	High Risk States	Medium Risk States
25	$9,000	$21,000
35	$8,000	$16,000
45	$8,000	$12,000
55	$6,000	$6,000

TABLE 2
BREAKEVEN AMOUNTS–TOTAL URINE ($48)

Age	High Risk States	Medium Risk States
25	$12,000	$24,000
35	$10,000	$17,000
45	$9,000	$13,000
55	$7,000	$9,000

If you go to the comprehensive, deluxe version of the urine test, where marijuana and all these other illicit drugs are added in, the protective value numbers are a little higher. Now that doesn't mean that this test is not as useful as the other one. I think many companies would look at some of the assumptions that Harry used and modify them to fit their own needs. In any event, these numbers are close to those of the basic urine test. They're not far away. I would venture to guess that we are not going to sit here and decide to test at 9,000 or 8,000? So don't look upon these as absolutes, but do look upon them as relatives compared to where you are now. And if you are more comfortable in using the more comprehensive test, don't let it bother you that at age 25 with $30, you get a break-even at $21,000, but with the comprehensive test it's $24,000. There really isn't much difference in my mind between those two tests.

Let's now turn to oral fluid. This is from a study that I did earlier this year. In Table 3 I used $30 just to be able to compare to the urine test at $30. I did not include an estimate for the value of the sentinel effect. Remember oral fluid tests are for HIV,

cocaine, and nicotine. With no extra value for the sentinel effect, that's what the break even thresholds turn out to be under my assumptions. We're still at $20,000 or less.

TABLE 3
ORAL FLUID TESTING—$30
BREAKEVEN AMOUNTS AT 8%
(NO SENTINEL EFFECT)

Age	Amount
25	$20,000
35	$9,000
45	$10,000
55	$15,000

When you add my estimate of the value of the sentinel effect, and we'll talk about that a little bit more in a minute, those numbers are nearly cut in half, at least at the younger ages (Table 4). And this is still at $30. I would venture to guess that the laboratories that are selling you the oral fluid tests are not going to charge you $30 to use it. Even when you include the concept of kit wastage in their actual cost value, your cost is likely to be less than $30. I'm not going to say it's as low as $18. There's no reason not to test.

TABLE 4
ORAL FLUID TESTING—$30
BREAKEVEN AMOUNTS AT 8%
(WITH SENTINEL EFFECT)

Age	Amount
25	$11,000
35	$6,000
45	$8,000
55	$12,000

Mr. George: These are based on what percentage of lying smokers?

Mr. Bergstrom: Between about 4% and 7%. However, I did not know when these were prepared, that Hank had information about how smokers amnesia, as he calls it, is twice as high as what I have used here.

I realized that we're going through this kind of fast, but I want to add a little analytical perspective to what Hank said earlier, about the home HIV test collection kit. I'm going to presume that roughly one in 300 people in the U.S. above the age of 12, in other words, adult citizens, is HIV positive. That number comes from the roughly 800,000 people that the Centers for Disease Control (CDC) and other groups estimate are HIV positive in this country. Therefore, the general adult prevalence can be found by taking that number and dividing by the number of adults above the age of 12. You get about 0.33%. But when you think of HIV, 95% of those ever diagnosed with AIDS or ever diagnosed with HIV were between the ages of 20 and 59. But if you look at the HIV prevalence between the ages of 20 and 59, it's not 0.33% it's 0.66%. The tested prevalence from the laboratories of HIV positives is about 0.06% and that may be on the high side. So it's one-tenth of the general population in prevalence. This is the sentinel effect.

What does this tell us? Well, not all of the 800,000 people who are HIV positive are going to apply for insurance. There are simply some who won't. I'm going to assume, just for purposes of this numerical illustration, that half are legitimate insurance buyers at some point in time. I will further assume that because of home testing, or the availability of the home test, that many of these people will find out in the course of the next year or two that they are indeed HIV positive. In fact, I would bet you that the 0.06% of HIV positive people who get caught being tested do not know they are positive. My point is, there will be a large number of people who now know that they are positive and will do something about it.

There's roughly 10 million individual ordinary life applications written for adults each year. What does that say? If we get 200,000 people, half of the 800,000 is 400,000 and over two years, it's 200,000 people a year that are now HIV positive applying for insurance. What's the prevalence rate going to be? It's not 0.06% It's not 0.6%. It's 2%. Do you know what happens to the protective value threshold when I use R = 2% instead of 0.06%? The protective value threshold falls right to the floor. You must test during the next two years at every amount applied for.

To put a number to what I just did, assume the present value of someone with HIV is roughly $450 per 1,000. I think the range is between $200 and $600 depending upon where they are in the infection curve. But assume for the moment that $450 per 1,000 is reasonable, and that agent-collected saliva and/or urine tests cost roughly $27 to use. When you do the math, the breakeven threshold is $3,000. That does not even count the value of the drugs and the nicotine screens!

I'll share my definition of the resistancy factor axiom. Maybe 2% of the people who apply for insurance may be HIV positive in the next two years. There's something called the resistancy factor axiom which hypothesizes that the relative prevalence of

knowledgeably impaired applicants will increase in companies that choose not to lower the testing limits. The point is that if half the companies lower their limits, and the other half do not, there will be a migration of applicants moving to those companies who do not lower their testing limits, and a 2% prevalence might even be a low number.

From the Floor: The brokerage people tend to be more sophisticated than traditional agents with some companies. There are notable exceptions, of course. As a result, they realize the implications more. It isn't worth it to them to take the risk where people who write few policies and understand the process less may be more inclined to try to pull a fast one, so to speak. I don't think I've ever seen any data that suggests that there is one favored distribution system. I do know that two companies with whom we do business are in the direct response end, and have had substantially higher cocaine and HIV positive rates than have companies with agency forces, suggesting again, and supporting what I said earlier, that this distribution method is highly vulnerable to antiselection. People tend to migrate towards the agentless distribution system, when they think they have something to hide.

Finally, I'm not so sure that teleunderwriting, a new Prudential concept, is going to lead to altogether better underwriting results, on balance, as far as the validity of information gathered. When this method is compared is having this done from the home offices, you lose protective value. This is based on the premise that the home office is better able to gather more honest information from the clients. Since the field underwriting may be influenced by an intermediary who has something to gain by distorting the information, at least theoretically, you lose all the protective value, all the present value of the agent as your intermediary. Seeing the client, and I think a lot will be lost. I happened to be a strong believer that the old way, until proven otherwise, is extraordinarily effective. And this teleunderwriting has a lot going for it. It also loses a great deal because we no longer have somebody out there with at least a putative allegiance to us. That troubles me. I think something great will be lost in the process.

Mr. Martin Snow: Hank, you mentioned that when XYZ Company started to use the oral fluid test, they found an increase in smokers' amnesia and instead got 14%. I was wondering if they had used any other forms and tests before they started to look at oral fluid? And if so, what were their results?

Mr. George: I don't know what their results were before they went to oral fluid. They were using blood HIV testing. On blood testing, we do not routinely do cotinines. Cotinines are in urine. So I don't think either of these companies had any significant experience where HIV and cotinine were combined in the same

protocol. They obviously did urine cotinines before, but you'd have to talk to Tom and to Sandy, because they didn't mention those data in their report.

From the Floor: Any time a new test is implemented, whatever you're testing for, if it's something that the applicant has under his or her control to keep from you or tell you, you'll probably get something that's double of what you'll end up with in a couple of years. When you go back and look at HIV back in the late 1980s, when the tests first came out, their prevalence rates were close to 0.1% of tested business. They are roughly half that. My guess is that the 14% is probably correct, but that number will come down as the general public finds out that nicotine can be found in saliva.

Mr. George: I disagree. I don't think you're going to get much difference. I think people are going to lie about smoking regardless of whether they think they're going to get caught.

Let me tell you one last thing that we should have mentioned. Dan Scott, the medical director of State Farm, spoke at the Southeastern Home Office Underwriters meeting. Dan made the point that when State Farm began its oral fluid testing program, it lowered its testing face amount. It introduced oral fluid with HIV. I don't remember the exact number, but he said State Farm's testing shot up. It actually doubled. I almost thought it was 2.5 times the HIV positive rate; and that number migrated back to slightly higher than, but much closer to, the blood HIV prevalence rate over a period of a year. That is, in the words of a good lawyer, prima facie evidence, and there is much antiselection out there that is detected.

I remember a company that I used to do business with, before I joined Lab One in a different milieu, that tried an experiment. The data on this were never published. I'm sure you'll never even find anybody who will admit to it and I certainly can't tell you the name of the company. It was a prominent eastern mutual that tried a very short-term experiment. They ordered blood tests on all individuals who applied for policies between $90,000 and $100,000, when their testing threshold was $100,000. It was an idea proposed by a medical director, who is now retired, to see if there were a large number of people who were buying just under the testing threshold. The data were never published, but they found that 40% of the applicants applying for policies over $90,000 and less than $100,000, were either HIV positive or were withdrawn suddenly when requested to have a blood sample. The story was relayed to me anecdotally by somebody who's now retired and I would have paid that person a week's wages to get that published. It is the best evidence in the world for what we know, but we can't show you hard data. These applicants are out there and they are buying policies under testing limits.

From the Floor: I have a question for Vera. Is there a confirmatory test that indicates the presence of HIV in urine such as a Western Blot type test? Does that exist?

Ms. Dolan: I believe there is a urine Western Blot.

Mr. George: The urine screening test for HIV is FDA confirmed. Urine Western Blot is not FDA confirmed. It awaits FDA approval but it's immaterial to the insurance industry because the incidence of positives on any urine screening for HIV is so small. Those can simply be reflexed to a blood test without any appreciable expense.

From the Floor: With respect to both cigarettes and HIV, how much difference in applicant lying might there be on direct response applications and U.S. brokers applications versus agency applications? Also how much of an impact do you think teleunderwriting is going to have in preventing or encouraging antiselection?

Mr. Bergstrom: I have my own feeling about that, but that's a decent enough question to ask anybody in here who has a feeling about it. When it comes to the smokers' amnesia question, for example, how might the different marketing techniques cause the percentages to vary?

From the Floor: What effect would distribution systems have on the percentage of people who lie about either HIV infection or tobacco use?

From the Floor: There have been some studies showing that when someone talks to someone else, whether it is in person or over the phone, you're more likely to get a more honest answer than if someone is sitting here thinking about choosing yes or no on an application. I can't quantify that for you, but I would guess that would be the telephone interviews. There's likely to be more honesty.

From the Floor: There's a paranoia about the multipart question. Actually, the fact of the matter is, that the only data I've ever seen where the brokerage versus the, shall we say the traditional field fores were compared, was data in the U.K. As I recall, they found the traditional field forces tend to have worse results than brokers.