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SUBSTANCE MISUSE AND UNDERWRITING

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- Types of substance misuse
- Impact of substance misuse on mortality and morbidity
- Identification and screening techniques and technology
- Underwriting techniques

MR. O. DAVID GREEN III: One of the jokester's favorite topics is our old friend, the drunk. One of my favorite stories is the following:

> The drunk was hauled before the judge. The judge looked sternly at the man accused of driving under the influence. "You know, the last time I saw you here," the judge began, "I thought I told you I didn't want to see you here again."
>
> "That's what I told the cop," the man replied, "but he arrested me anyway."

Why is this so amusing? Is this how we view ourselves? Is it an accurate portrayal of our legal system and our help--or lack thereof--for the alcoholic/drug misuser? Frankly, the story is a little bit amusing, even if it does hurt.

Much is being said, and even preached, about the problems associated with the excessive use of alcohol and other mood altering drugs. This

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presentation will not repeat endless statistics. Rather, we want to offer you some information of a different sort:

- o detection of the problem
- o interpretation of data when appraising the risk
- o solution of the problem
- o a few thoughts on taking this subject out of the classroom and back into actual practice

I do have a couple of statistics for you that you may not have seen:

1. On any given weeknight, one driver out of 50 is drunk. On the weekend, the ratio is considerably worse: it is one out of ten.

2. In 1981 in the northern half of St. Louis County, Minnesota, there were 31 traffic fatalities. Of these 31 deaths, 28 were due to some use of alcohol or other drugs. Only three were classified as "real accidents"--cases where no driver had been drinking.

3. On a similar sobering thought, the September 1985 issue of Reader's Digest contains a minute-by-minute account of 55 people who died on Saturday, January 21, 1984--a date chosen at random. Each of these deaths involved alcohol. Another 48 people died similarly the next day.

We see these figures daily in our work, particularly in claims analysis. It is no secret that the category of accidents/suicides/homicides is the third largest class of deaths. It does not matter whether a death was due to an accident or suicide or homicide or whatever. A life still has been lost. A claim has to be paid.

What matters is that we accept many of these lives in the underwriting process, knowing that a percentage soon will mature as a death claim, even when something can be done to the contrary. Detection of substance misuse is possible. Declining an application or issuing a policy on a substandard basis just may be the beginning of the recovery process.

I already have directed my remarks at alcohol. Alcohol is but one member of the family of substances we misuse. We are talking about all substances, alcohol and drugs, including uppers and depressants.

MR. ROGER K. BETTS: The testing methods that we use at the Home Office Reference Laboratory (HORL) are helpful to the insurance industry in discovering some of the early mortality before it occurs.

I would like to discuss the drug abuse testing facts and methods. When a laboratory has decided to perform analyses for drugs of abuse, it must establish which methods it is going to use to perform these analyses. They are generally four methods:

- high performance liquid chromotography
- gas chromotography
- thin layer chromotography
- enzyme amino assay

Both the high pressure liquid chromotography and gas chromotography are sensitive and specific methods, but the necessary equipment for these procedures is expensive. This results in costly testing. These two methods are used more often for research and development rather than for day-to-day use. Thin layer chromotography and enzyme amino assay, which we use at HORL, are also specific and sensitive. These are most often the methods of choice by laboratories because they allow the testing fees to be economically acceptable.

Drug abuse testing is usually performed on urine specimens. In performing these analyses, the laboratory must maintain a great deal of quality control. This is done by using controls which are known positive and known negative. These controls must be used each time an analysis is performed. If they are not used each time, they usually end up in "60 Minutes" or "20/20." These controls will assure the technologist that the instrument is functioning correctly and the reagents are performing as expected. We also prescribe to the proficiency testing program offered by the Center for Disease Control in Atlanta, Georgia.

When we perform these analyses, we use only one method to identify the presence of a drug or drugs. If a positive result is found on that specimen, we automatically perform the analyses for this drug again, but by a different procedure. This firmly establishes the presence of the drug.

HORL also performs marijuana testing for the life insurance industry. This testing requires a blood specimen for analysis. Up until now, this testing has been quite limited. We haven't had a large request for it yet. Probably, there are too many users. We won't be able to insure anyone!

We announced earlier this year that we would analyze specimens for cocaine only upon request. This is at a lower cost than the full drug screen where cocaine is also analyzed.

Part of the bulletin that we sent out on July 15, 1985, cited the following articles:

- New York Times, December 1983, "Illicit Drug Sales, $79 Billion Annually."
- U.S. News and World Report, June 1983, "General Motors Loses $1 Billion a Year from Drug and Alcohol Abuse."

- Newsweek, February 25, 1985, "The Number of Cocaine Addicts Has Risen by 600 Percent."

- Fortune, June 1985, "Doctors Who Treat Executives are Virtually Unanimous in Saying that Executive Drug Abuse is Widespread and Increasing Rapidly."

- Wall Street Journal, March 1985, "On-the-Job Cocaine Use Soars and Work Quality Suffers."

This is why we now are testing for cocaine for the insurance industry. This procedure was added to our testing parameters because of this increased use of cocaine. Cocaine was a minor public health problem 15 years ago. In 1970, it was found to be used by 1 percent of the public. In 1981, it was being used by 6 percent of the population. It now has been estimated that over 10 percent of the public uses cocaine at one time or another. Approximately 51 metric tons of cocaine are smuggled into the U.S. annually, and that's only the part they can count. Cocaine has the highest continuing rate of drug abuse cases in emergency room visits, overdose deaths, and serious clinical problems. The preclinical observations and related clinical data established by the National Institute of Drug Abuse led to the conclusion that the prospect of substantial increase in available supply and decreases in price constitute a major and growing public health danger. Many users of marijuana, especially heavy users, also turn to cocaine.

Drug abuse has taken the business world by storm. A survey of 160 hospitals has found that in the last few years, the treatment of executives has increased 100 percent. Most executive addiction is encountered in the so-called glamour industries: entertainment, advertising, high finance, high technology, and professional sports. Urine lab representatives, medical directors, and people in underwriting have told actuaries that the glamour industries are the major fields involved.

Although the latter is true, cocaine addiction is not confined to those fields, nor to the coastal areas. In preparing an article for Fortune magazine, there were discoveries of a midwestern marketing executive for AT&T, a vice-president of a major pharmaceutical firm, a senior executive of a food processing company, a vice-president of a Minnesota bank, and an executive vice-president of a midwestern life insurance company, all using cocaine. You may find cocaine use throughout the executive world. According to most experts, cocaine use is growing more rapidly than any other form of executive drug abuse.

Cocaine is rapidly metabolized to a chemical called benzoyl ecgonine. This is the major metabolite, and the ecgonine methylester is a sub-metabolite, not nearly as prevalent as the benzoyl ecgonine. The blood and the liver do the metabolizing of this drug. The cocaine can be detected within four hours after inhalation, and it can remain for as long as 48 hours. When we perform the cocaine testing, we use two different methods on all-positive specimens. Again this is to confirm the presence of cocaine. We have analyzed over 4,000 specimens in the last 18 months at HORL. We have found 1 percent positives for all specimens that were submitted for screening. These aren't select

cases. These cases come from companies that are screening by different criteria.

One company initially started this a year and a half ago. The first specimen we had from an applicant was one of a husband and wife team. They wanted $3,000,000 worth of insurance, and on a Wednesday afternoon at three o'clock, they were found to be positive for cocaine. I maintain that's probably not recreational; it is more of a maintenance dose. The other company that was screening early on also found a positive result on its first case, which was $1,500,000 on a 28-year old professional.

The criteria used to screen for this cocaine are either all urine specimens or all blood profiles that are sent to HORL and analyzed. We are able to do that because there is a urine specimen in each blood profile submitted. If ordering this procedure selectively, you only need to mark the urine or blood profile identification slip for the appropriate test requested. That specimen will be analyzed for cocaine or for a full drug abuse screen. These results are then sent to the insurer by dataphone the same day. If you wish to screen all applicant specimens for cocaine, you can call or send a letter to us, and we will automatically perform these tests on each individual specimen that is submitted.

We also test blood specimens for markers that indicate alcohol misuse. The most sensitive indicator is gamma-glutamyl transpeptidase (GGT). Dr. Graham and Mr. George will speak more on this. We at HORL have observed about 8 percent abnormal GGTs for all specimens submitted. This percentage increases to 9 to 11 percent between the ages of 35 to 55. We have statistics on over 200,000 blood profiles from the last three years that have been submitted strictly for the insurance industry on a screening basis. You can obtain these data by writing or calling me at HORL.

I will briefly discuss the HTLV-III, T-cell, and immune system profile testing that HORL announced on October 1, 1985. We are performing that test now. There are companies that are requesting it. Some companies are running the HTLV-III in all states. Some companies are asking for the T-cell test in Wisconsin and California where there are some law restrictions. We have run, since October 1, about 400 of them, and we have had around 1 percent positive HTLV-III. We also do a Western Blot if each HTLV-III is positive a second time. The 1 percent is a bit more prevalent than what the blood banks have found. They were finding around 0.3 percent positive.

We started this blood profile testing in 1982 with Dr. Graham and his company. We were doing a few specimens a month at that time, and it moved up to around 2,000 at the end of that year. We are now performing over 10,500 blood profiles strictly for the insurance industry each month. So it has become quite popular. The drug testing has also become popular, although it has not quite reached those numbers. So you wouldn't be the only one on the block if you should decide to use these tests.

MR. HENRY C. GEORGE: The subject of my presentation this morning is the underwriting perspective on substance abuse.

Our present screening requirements for life insurance underwriting are out of balance. I am talking about the age and amounts screening which we do on larger cases. Despite declining death rates from heart attacks and strokes, the preponderance of our requirements still seek our occult circulatory diseases in our applicants. Requirements like the resting and treadmill electrocardiograms, the chest X-ray, urine specimens, and careful medical examinations are all directed primarily to circulatory disorders.

Little is invested presently by most companies in looking for evidence of substance abuse or of "lifestyle underwriting" problems.

The futurists prophesied several years ago the future of life expectancy and that curious phenomenon called the squaring of the mortality curve. They said that in the near future most risk selection for applicants under age 60 would be directed toward lifestyle rather than a search for disease. As I agree with this projection, I want to discuss what I call the "armamentarium of the contemporary lifestyle underwriter."

I will review some of the tools that we either are using currently or are apt to have access to in the near future.

The first is diet, which is a critical factor in coronary heart disease in many individuals. This relates well to what we all have been doing with electrocardiograms and chest X-rays and has to do with detecting people who are still on milk and butter as a staple diet--those who are at risk for developing the so-called exogenous or "getting it by eating" type of early coronary heart disease. We have several tools; one is available to us currently; the other one, with any luck, will be available within the next few years. We already make abundant use of the cholesterol to high-density lipoproteins (HDL) ratio as an indicator of an increased (or decreased) risk of early coronary disease. The higher your cholesterol level is, the lower your HDL level, and the better your chance of harboring early coronary disease. This is well documented in medical and insurance literature.

There will soon be a new test accessible to us which will increase our capacity to screen for atherogenesis. The test is not yet on the market for insurance purposes. It is available clinically, and it is referred to as the apolipoprotein test or, if you want to use the shortened form, apoproteins. Apolipoproteins are the carrier proteins bound to lipids (blood fats). By lipids, I am referring to such things as cholesterol and triglycerides.

These substances do not mix well in an aqueous medium, so to facilitate their vital transport to tissues, they bind with proteins in macromolecular complexes we call lipoproteins. We assay these lipoproteins to determine if someone is going to die prematurely of coronary heart disease or whether they are going to outlive the mortality tables.

Exciting research has demonstrated that there are two apolipoproteins which are useful in identifying persons as increased or decreased risks of early atherosclerosis. One of these is referred to as Apolipoprotein A-1, a substance which is associated with HDL, and the higher the level, the lower the risk of coronary heart disease. The people who have high Apolipoprotein A-1 levels will actually retard the formation of cholesterol-bearing plaque in their coronary arteries and subsequently have a low risk of heart attack and the other complications of coronary heart disease. Conversely, Apolipoprotein B-100 is associated with low-density lipoprotein or cholesterol. Consequently, when its level is high in the blood stream, we have an accelerated risk of early heart attacks and chest pains from coronary disease. So, I forecast that within a year or two, the laboratories serving our industry should have these tests available, which will increase greatly our capacity to screen for early coronary disease.

Another important feature of lifestyle underwriting is screening for smoking. Some of the approaches we take to identify smokers who develop "temporary amnesia" when they apply are as follows:

1. Nicotine/cotinine urine screen

2. Thiocyanate test (urine, serum, saliva)

3. PHI/Inspection Report

4. APS Smoking Question

At present my company is using the nicotine/cotinine screen provided by Mr. Betts and his colleagues at HORL. We find this invaluable because it allows us to detect tobacco users who deny smoking cigarettes on the application. You are probably aware that several companies are marketing a test using saliva to measure a substance called thiocyanate, which is a by-product of smoking. This has pluses and minuses, but on balance, I think the nicotine/cotinine screen is superior. If you are interested in this, you might want to read my paper on smoking tests in the last issue of the Journal of Insurance Medicine.

In the area of drug abuse, Mr. Betts spoke at some length about HORL's technology for screening for a variety of drugs of abuse. My philosophy has always been that we don't care about identifying the marijuana smokers, and the heroin users don't care about buying life insurance. The group we care about obviously are the people who are using cocaine, particularly those who are using it regularly. The lab, and indeed the medical profession, have urine toxicology technology available to screen for people who are abusing this substance. Using this technology will accelerate in the insurance industry on large amount applications in the near future. This is not so much a statement about our concern for the value of the test, but rather our fear of adding it to our profile at a time when our field force may look askance at this testing modality.

There are three different tests used both in clinical medicine and in insurance medicine to detect individuals who may be at some increased

risk of harboring the devastating disease AIDS. These tests are as follows:

1. ELISA (HTLV-III Antibody) Test

2. Western Blot Test

3. Helper: Suppressor T-Cell Test

At present, I am told that several companies already use these tests to screen applicants.

At HORL, the ELISA test (enzyme-linked immunoabsorbent assay of antibodies for the virus thought to be responsible for AIDS) is readily available. Keep in mind that this is an antibody test. It is not a test for viral antigens elaborated by the virus or for the virus itself. It simply detects a host response, and you can sometimes get a host response which is not representative of truly detecting HTLV-III being on board this particular individual. To correct for the problem of a false positive, there is another test, a more difficult, more expensive test, called the Western Blot. This is another type of antibody test, and when it is performed in conjunction with HTLV-III and both are positive, there are a lot of things that you can say about this individual. One thing that you can say with great certainty is that he is making antibodies to the virus thought to cause the AIDS disorder. Finally, there is a test of white blood cells (called T-lymphocytes) which measures the ratio of helper cells to suppressor cells. When this ratio is disturbed, there is a high probability that the individual has an immune disorder. Unless he is on immune suppressive drugs or has some rather unusual condition, also uninsurable, the probability is high that he is indeed an AIDS victim. So these tests will in time allow us to identify a devastating mortality subpopulation who right now have the potential for considerable antiselection.

Alcohol abuse has definite underwriting ramifications. A couple of years ago the prestigious Annals of Internal Medicine, one of America's leading medical journals, had an article in which the authors stated that "alcohol is the third leading cause of death, ranking behind coronary heart disease and cancer." This understates dramatically the impact of alcohol abuse in our select period death claims where alcohol abuse is a major cause. In some companies on term products, alcohol is the major cause of premature mortality. Alcohol abuse is responsible for at least 50 percent of the motor vehicle fatalities in this country, a much larger share of those occurring under the age of 40. Thirty to 40 percent of suicide cases are related to alcohol abuse. Greater than half of the homicides and other trauma-related deaths are related to alcohol abuse. Alcohol-induced cirrhosis is the seventh leading cause of death in the U.S. At least 80 and perhaps 90 percent of all deaths from cirrhosis of the liver in this country are related to alcohol. So, the impact of alcohol is far greater than liver disease. In fact, liver disease is probably the second leading cause of alcohol-related death in our society.

In the 1981 Large Amount Mortality Study done by the Society, the leading cause of death among term applicants was accidents, suicides, and homicides. Cancer was a distant third, and coronary disease didn't even make the top three. It almost makes you wonder if owning term insurance predisposes one to trauma.

Causes of Death

General Population	1981 Study Permanent	Term
1. Heart Disease	1. Cancer	1. Accident/Homicide
2. Cancer	2. Accident/Homicide	2. Suicide
3. Accident/Homicide	3. Heart	3. Cancer

There was a study done in the late 1970s by a large health care organization centered in California, the Kaiser Permanente Organization. The study was published in the Annals of Internal Medicine and looked at four cohorts of patients, matched according to their alcohol consumption habits and studied for ten years.

Kaiser Permanente

Mortality by Alcohol Intake

	Drinks per day 0	1-2	3-5	6+
Overall	8.8%	6.3%	9.3%	12.7%
Cancer	2.2	2.1	2.6	3.7
Accidents	0.8	0.4	0.9	1.9
Coronaries	3.3	2.0	2.3	2.7

Excluding teetotalers (i.e. persons consuming zero drinks per day), you can see that as alcohol consumption increases, so does the overall death rate. Look at the linear relationship between the light social drinkers, the moderate social drinkers, and the heavy drinkers. Ten-year mortality went up smoothly; cancer mortality went up smoothly; accident mortality nearly quintupled, and even coronary disease mortality inched its way up and almost got to the level of the teetotalers. This is just one of several studies showing the linear relationship between alcohol abuse and early mortality.

We have in our armamentarium a variety of testing methods and other tools for identifying alcohol abuses:

1. Gamma-Glutamyl Transpeptidase

2. HDL

3. Mean Corpuscular Volume RBC Index

4. PHI/Inspection Report

5. APS

I will talk to you at length in a few minutes about the enzyme test Gamma-Glutamyl Transpeptidase. We also have paradoxically high-density lipoprotein, a marker for coronary disease. This HDL test is fine when used in conjunction with GGT to identify people who are raising their HDL by consuming alcohol (Option B). Alternatively, you can raise your HDL and lower your risk of heart attack by living a Spartan existence: not smoking, getting lots of exercise, and so on (i.e. Option A). Option A, exercise, and Option B, drinking, are both ways of protecting against the heart attack.

These are the ingredients of the contemporary blood profile marketed by HORL:

Blood Chemistry Profile

Liver Tests	Kidney Tests	Other
GGT	BUN	Cholesterol
SGOT (AST)	Creatinine	Triglycerides
SGPT (ALT)	Uric Acid	HDL
Bilirubin		Glucose
Alk. Phos.		Albumin
		Globulin
		Total Protein
		(Glycohemoglobin)

As shown, GGT is one of the five liver tests.

For years, insurance companies have identified blood profiles on their list of requirements by the ancient term, SMA-12. The SMA-12 is an obsolete test which is not appropriate for underwriting. It contains neither the GGT nor other important components of screening such as HDL. I will show in a cost benefit statement that these are the two ingredients which produced nearly all of the value when the Northwestern Mutual looked retrospectively at this year's first six months of blood tests. So, if your requirements include the SMA-12, I can't urge you enough to abandon this ancient and valueless test and switch over to a true blood profile.

Gamma-Glutamyl Transpeptidase in Europe is referred to as Gamma-Glutamyl Transferase. The acronyms, GGTP and GGT, are completely interchangeable and both identify the same test.

As alcohol use increases, GGT levels rise. All of the other liver tests that we have used now for some decades to identify people who have liver diseases, alcoholic and otherwise, require that the liver be injured and that the leakage of enzymes or other mechanisms, involving liver damage, cause the enzyme level to rise in the bloodstream. With the advent of GGT, we no longer have to do that. GGT is elaborated by a mechanism unrelated to cell injury. There is a neat little system within the liver called the microsomal-oxidase that makes this enzyme, in response to the taking in of various enzyme inducing substances, the leading one of ethyl alcohol.

There have been a number of landmark papers on GGT. I refer you to these because you may need them should you adopt the test, to defend yourself against parties who are less receptive. One of these was published in London, England, in 1975 by Sidney Rosalki. He said GGT is superior to other screening tests, (i.e. AP, SGOT, and SGPT). He goes on to state that "liver disease is unlikely to be present if GGT is normal." So much for the medical director argument that SGOT is the state of the art in screening for liver disease.

In 1980 David Goldberg in Toronto said: "GGT is a test of excess alcohol consumption independent of liver damage." All of the other tests that we have traditionally used require damage to the liver cells before the blood levels of the testing modality rise. This is not true in GGT.

Finally in 1983, in Dusseldorf, West Germany, Nishimura and Teschke said: "GGT has been shown to be the most remarkable marker not only for alcohol-induced liver lesions but also for alcoholism itself."

There was a great epidemiologic study in Malmo, Sweden. I call this "the Framingham of alcohol abuse." Middle-aged males were screened for a variety of parameters thought to be related to early disease and death, things like blood pressure, cigarette smoking, cholesterol, and GGT. In the Malmo study, the authors, Peterssen, Trell, and Hood, found that GGT "was the single screening variable most strongly correlated with total premature mortality." GGT had more impact on early deaths than cigarette smoking, cholesterol, hypertension, or anything else.

In terms of morbidity, on which we have little data for underwriting, as the GGT level rose among the patients in the Malmo study, the number of sick days per year escalated dramatically. People who had GGT levels more than two times normal had more than 60 days of absence a year with a preponderance of those being Mondays. Those with "low" GGT had fewer than 15 days of absence. So this is a valuable test applicable to disability income and major medical insurance underwriting, every bit as much as it is to life insurance underwriting.

The GGT test would be worthless if it did not prevent antiselection. However, there are two factors that insulate against antiselection. First, imagine the scenario where a client comes in on a Monday morning to have his blood drawn by the local paramedical company as part of your underwriting. The GGT turns out to be three times normal. The underwriter is about to send the case to facultative reinsurance. The agent calls and says: "Hey! All bets are off. As fate would have it, my client was at a class reunion on Sunday night. The first time the poor boy has had two drinks in an hour in his life. He rode home propped up in a taxicab singing the school's fight song. Therefore, you must ignore the results of this test." Many studies have shown that you cannot raise GGT with a single episode of binge-drinking. When alcohol elevates GGT, it does so after a period of weeks of heavy intake.

Five studies here and in Europe have demonstrated with thousands of volunteers that you cannot elevate GGT with a single binge of drinking, no matter how much you try. In one study in England, they fed the volunteers six pints of Guinness, and in spite of that, they could not raise GGT in a single volunteer. So there is no way the agent can duck responsibility for the inevitable rating or declination based on the argument that "My client had his only binge of drinking the night before the test."

Second, GGT does not normalize in less than 30 to 60 to sometimes as much as 90 days after abstinence. Once someone elevates their GGT level through the judicious application of ethyl alcohol, it stays elevated for many weeks. This protects us against the applicant who is willing to go through a cold turkey weekend, i.e., avoid drinking for three days and come in trying to beat our system.

These are the age and amount blood profile limits used by Northwestern Mutual Life.

Life Age/Amount Limits
Blood Chemistry Profile

Age	Amount
18-50	Over $300,000
51-75	Over $200,000

These limits were adopted by our company on April 1, 1984. We are currently performing about 10,000 to 12,000 blood profiles at these limits every year. We find this test to have extraordinary value, and I want to show you the results of our cost/benefit analysis.

My colleague, an actuarial consultant to our underwriting operation, William T. Chambers, did a cost/benefit analysis of our blood profile earlier this year. The following represents the dollar value per thousand of coverage of the present value of anticipated mortality based on blood profile results.

Blood Profile Cost/Benefit Analysis

[Values per M]

	Ages					
	20-29	30-39	40-49	50-59	60-69	All
All Tests	1.51	5.00	11.77	15.21	11.21	7.57

The overall return was $7.57 per thousand of face amount. The following breaks down the results by test.

Blood Profile Cost/Benefit Analysis

[Values per M]

	Ages				
	30-39	40-49	50-59	60-69	All
GGT	2.22	7.28	10.45	7.30	4.37
HDL/Cholesterol	1.88	2.93	1.82	--	1.90
SGOT	0.25	0.75	1.40	0.79	0.49
AP	0.08	0.63	0.86	1.54	0.34
Glucose	0.46	--	--	--	0.26

The $4.37 of the $7.57 was attributed exclusively to one test, the GGT. Hence, this is the most important underwriting test we use. A distant second was conferred on HDL/cholesterol, with most of the value peaking in the 40s. The other tests that contributed were negligible by comparison to GGT. This explains why you should never use the SMA-12 as a screening test. GGT and HDL are not tested by the SMA-12.

The bottom line was this: The average cost of a blood profile in our company, which includes drawing the blood, analyzing it in Kansas City, getting the results back, and the underwriter processing the results, was approximately $40 per unit. The present value of anticipated mortality per thousand of face amount was $7.57. By simple division, the break-even point was $5,284 of face amount. At the time we did this, we were hoping to set new limits for all amounts in excess of $100,000. We attempted to calculate the return, the cost/benefit ratio, on the naive assumption that we could actually set the limit on all amounts over $100,000. The return was $36 for every dollar spent. How many of you are accustomed to getting 36 to 1 returns on your requirements? That beats the 20 to 1 return we got on APS at the older ages; the 14 to 1 return on the personal history interview; the 10 to 1 return on the resting ECG; and the 1 to 3 loss on the chest X-ray.

The use of the GGT test in screening by insurance companies in the U.S. has accelerated dramatically in the last few years. I predict that, within a few years, the use of this test in the U.S. will be almost universal. By this I mean the people we turn down for having high GGT (and being likely alcohol abusers) will be coming to companies that do not run this test. This group of applicants will cluster in your select period death claims.

These are my underwriting perspectives on the GGT test based on laboratory values.

Normal	0 - 65
Gray Zone (?)	66 - 99
Significant*	100 - 250?
Prohibitive (?)	Over 250

*Excludes epileptic applicants on phenytoins/barbiturates.

The normal values at HORL go up to 65. In keeping with the long tradition in insurance of giving the house away on borderline results, we consider readings up to 99 to be a gray zone. This means, if the applicant is squeaky clean, we will overlook a slightly elevated GGT and issue him a preferred risk policy with great reserve. At amounts where the GGT is 100 or higher, we put on a rating starting around Table 2 and peaking around Table 9, and we send him off to our reinsurers. On cases where the GGT is over 250, we offer a discount on an immediate annuity!

The only caveat is that epileptics who are on Dilantin or Phenobarbital prophylaxis must be forgiven for GGT elevations in the significant but not the prohibitive range. This is because this particular test also elevates as those two drugs cause enzyme induction.

I will close my remarks with a typical case. A 48-year-old physician applied for $200,000 of term. He had no medical history, and the medical examiner found nothing. The blood profile showed us normal traditional enzymes (SGOT and SGPT). The GGT, however, was grossly elevated at 157 units, two and a half times normal. The HDL was remarkably elevated to 110 units. You don't see many three-digit HDLs. This fellow had a 2 to 1 cholesterol HDL ratio which is in the protective area and would suggest, at least, that he should be a preferred risk, and indeed that's what many companies would do. However, with a GGT of 157 and an HDL of 110, let me tell you where he is getting his HDL from: Option B. This gentleman is not jogging to get his HDL; he is drinking to get his HDL to 110. We offered him our substandard rating Table 4, and it ultimately went to facultative reinsurance!

DR. GARY D. GRAHAM: I would like to talk more about the whole field of alcoholism and other drug dependency and then share some information about our mortality results using the blood profile in the

underwriting process. The "state of the art" in insurance today is interesting from an underwriting perspective, and that is because mortality profit is increasingly important. Companies have gone into the interest-sensitive product line and into the universal life product line. As you look at anticipated profits and at those products without mortality profit, there isn't a lot left.

Looking at mortality in this country, the three leading causes of death in 1900 were tuberculosis, pneumonia, and diarrhea. It is interesting that those causes of death have changed dramatically, largely because of public health legislation. We are a company, like most of your companies, that don't like the regulators. But if you look at the disease process in this country, sanitation and public health law were probably as, or more, responsible than the advent of antibiotics. The leading causes of death today in the general population are heart disease, cancer and trauma. I am a cardiologist. I have spent 30 years, nine of those in the Navy, working in the field of treating alcoholism and other drug dependencies. An interesting thing which correlates with the information from the Annals of Internal Medicine is that the Health and Human Services in this country does not list the third leading cause of death, alcoholism, on causes of death. I find that remarkable. Alcoholism is the third leading cause of death. It is not listed as such by our federal officials partly due to the stigma that the illness still carries.

We lump all kinds of heart disease. Coronary atherosclerosis is the major form of heart disease killer, but that also includes cariomyopathy, valvular heart disease, cogenital heart disease, and so on.

Cancer includes 200 kinds of cancers, and people don't die of cancer. They die of bleeding; they die of infection; they die of drug toxicity; they die of space-occupying lesions; and so on. All cancers are lumped together to say cancer is our second leading cause of death.

Accidents certainly make up part of the third leading cause of death, a major part. If you look at the deaths due to alcoholism, traumatic death is the leading cause. That's not just those who have misused alcohol, but people who misuse alcohol and also have a definable illness called alcoholism. That's a distinction which is difficult for some people to make. You can misuse a drug in one of two ways. You can take too much of it; with alcohol, we say that you are intoxicated. That is a drug overdose, which is a misuse of a tranquilizing drug. The other way we misuse drugs is taking them at the wrong time. The majority of commercial pilots use beverage alcohol. It is this country's favorite recreational drug. We have to trust that the commercial airline pilot has not used recreational alcohol within the prescribed time before leaving the airport. That would be a misuse of the drug. Taking it at the wrong time is not alcoholism, but it accounts for a lot of our select period death claims. Certainly a lot of our overall death claims are in the select period.

Alcoholism or other drug dependencies are progressive illnesses which can be diagnosed. The illness is present whenever a person's drinking impacts negatively in any life area and continued use occurs, further

complicating their life. That's the definition of the illness. The person with alcoholism will misuse alcohol more frequently than the person who just drinks socially and occasionally drinks too much. As you look at the spectrum of the illness, one of the exciting things that has occurred in this country is that we are diagnosing it much sooner than we used to. If you look at a person's life areas--how he gets along with other people, his health, his finances, his legal dealings, his spiritual life--eventually all of those areas are affected by the illness of alcoholism.

Let's examine the skid row alcoholic. We were walking back last night from a restaurant and on the street we saw two people who, even without a GTP test, Mr. George and I could identify as having alcoholism. Their lives were affected obviously in all areas. They were impoverished; they were publicly intoxicated; and if we had done a personal interview, they probably would be spiritually bereft. They had probably lost family and friends, and they obviously had alcoholism.

The exciting thing in the real world is that we can identify alcoholics now sooner than that. And many of your companies have employee assistance programs which are helping people be confronted, be intervened with, and get into treatment much sooner.

The underwriting process is difficult. Many of you may have a field force different than ours. Kemper operates with the independent agent, and typically our agents will fill out an agent's report like this on the application: "I have known this individual for five years. He frequently drinks too much. Last week I saw him at the country club. He got drunk, and I know that he drove home and went into the ditch. I don't think that he is a good risk for this insurance policy."

Now that's the way our agents inform us about applicants. Yours may not do that. But as you look at guidelines, it is difficult to see what we can do to help dent the select period mortality.

Our companies, by virtue of some remarkable sales in the last few years, have a lot of our business in the select period. Typically, about a third of our claims yearly are from trauma. We think, by virtue of using the blood profile, that we have already lowered our percentage. If we look at our first-year death claims, accidents/traumatic death is the second leading cause of death. Our companies did something that may have been risky, and it certainly wasn't popular when we started it. In August of 1982, we decided to change the way we examined business. We already had set fairly high nonmedical limits, for those days. They look rather low now, and we are in the process of lowering them even further. At that time, our nonmedical limits were $250,000 at ages 1 to 40; $100,000 at ages 41 to 60; and $50,000 at ages 61 and up. We decided in 1982 that all of our examined business would be examined by one of seven national paramedical companies in conjunction with the HORL blood profile and urinalysis. We did that because we could not control either quality or cost of physicians' exams, and we felt that the HORL blood profile gave us more protective information potentially than any other thing that we were doing in underwriting.

The percentage of our business that, over a two-year period of time, had been examined was about 20 percent; 80 percent still fell into the nonmedical limits. As we looked at 30,000 of our profiles, we found that about 5.3 percent had elevated GTPs. Initially, it was higher in our companies. There are a couple of reasons for that. We think some business was selected away from us. That is, agents recognized what was happening and did some anti antiselection. They sent some people to other companies where blood profiles weren't drawn. The other is that, as you do any kind of test and do it on a much wider scale, you should see the percentage of abnormalities decrease. Currently, because 5 and 6 percent of our blood profiles will have abnormal GTPs. In the underwriting process, we use that only as a trigger mechanism.

Underwriters love to have a kind of "blood pressure-build" mentality. Blood pressures are great. There is a chart that says how much to rate them. However, a lot of underwriting turns out to have some art involved. That is, I can show you an abnormal cardiogram which ends up causing the declination of that application. That same abnormal cardiogram in another applicant might end up preferred. So, it is hard to take a value and say what happens to it.

When we see that abnormality, we look for other information. We obtain a motor vehicle record which can be helpful. If we see a DUI charge on the motor vehicle report, we know alcoholism is a big potential problem. If we see several reckless drivings in the underwriting process, that also indicates a problem.

We also will obtain an attending physician's statement and look for other indications of the illness. An abnormal value in the blood profile may result in a mild rating or could result in a declination. It depends on what other information is found, but it certainly acts as a trigger or as an alerting mechanism.

I looked at six months of our business in 1983. The majority of the people who had elevated GTPs were either withdrawn; were declined outright; or were rated and that rating caused them not to be placed. Thirteen percent were rated and placed. Twenty-five percent were accepted at a standard basis after thorough underwriting, and those were the just mildly elevated levels that were in the gray zone. The other information we could obtain was all positive.

I was pleased to see that the GTP was working that way for us. My goal was not to decline business, but to see what was happening in terms of our underwriting action.

Looking at our total mortality as percentages of actual to expected on the 1965-70 Basic Tables, our overall mortality, when last viewed, was running by number 80.7 percent. At the same time the paramedical mortality by number was 61.2 percent. Our medical was higher than our paramedical, which was a smaller number of cases by number. When you look at volume or amount, even more startling results are found. Our overall mortality by amount was running at 66.8 percent. Our paramedical by amount was running 47 percent, actual to expected. Nonmedical was running at 68.1 percent total experience.

Our paramedically examined nonsmoker business is our nonsmoker business that has a paramedical examiner. By number, actual/expected was 33 percent; by volume, it was 15.8 percent. There is some mortality profit potential in examining our business with the paramedical exam.

One other aspect of alcohol misuse is alcohol dependency (alcoholism) and drug dependency. In the underwriting process, we are not involved with a diagnosis of alcoholism of an applicant. When we seen an elevated GTP, we assume that the elevation is due to chronic heavy alcohol misuse which may be alcoholism. We assume this unless there are other reasons, for example, the use of Dilantin or some other reason. We have had several applicants who have been detected as having abnormal liver enzymes. These applicants received treatment after the information was sent to their physicians.

Our companies have had an interesting pilot experiment which we advertised quietly and subtly this last year. We have been looking at the recovering population. I have worked in the treatment field intermittently over the last 12 to 15 years, and our society has created a "Catch-22" situation. I first encountered this when I was still in the Navy. An active duty Navy officer who had been treated two to three years previously was filling out a routine security clearance questionnaire and on that questionnaire, he would note: "Three years ago I was treated at Bethesda Naval Hospital for alcoholism and have been in recovery since." His security clearance would be chalked. That didn't make a lot of sense to me because he was a security risk three and a half years ago when he was in the midst of his illness, not when he was admitting to recovery. We, in the insurance industry, have done that traditionally. We know that we are insuring people with alcoholism, with both misuse, chronic misuse, and dependency, but when a person who applies notes that he has been treated or is in recovery, we most often decline, rate, or make sure that there is a long period before that person becomes insurable at preferred or standard rates.

We started an experiment about five years ago. Currently I have about 3,500 lives that we are following in the recovery process. We have developed and used a confidential questionnaire, when the applicant admits to alcoholism being in recovery, to assess his recovery program. We have been able to take people at standard rates as early as 14 months. Certainly most of the people who are working a good program will be standard at two years of recovery. With that block of business over the last five years, we have had two deaths. One was an obvious relapse--an alcoholic death; the other was unrelated. I have not asked any of my actuarial colleagues to help me with looking into the numbers. But I am sure that we are accumulating enough time and lives soon that the number of policies may be an important thing to report to the industry.

MR. JAMES W. PILGRIM: With these tests that you are able to perform on your applicants and the relationship of substance abuse to the accident cause of death, what decrease in the accident cause do you think you have been able to make by this selection process? For years I have been saying that one of the difficult things for the underwriter

to do is to underwrite the accident hazard. When we do our mortality studies, and I have done them both for direct and reinsurance, we find that traumatic causes of death have been the lion's share of the large cases in the early durations. The accident, homicide, and suicide become barely important causes of death relative to heart, cardiovascular, or cancer. Have you been able to measure the improvement or the decrease in the number of deaths due to traumatic causes?

MR. GEORGE: We have been using GGT at the Northwestern for about a year and a half, so it is premature for us to be able to detect the direct impact. We did look at a large sample of cases on which GGT was abnormal, looking for indications about this business that would suggest that this would be trauma death vulnerable business. Curiously, they were mostly businessmen, the mean age was about 46, and there were no harbingers, if you will, globally, of excess trauma mortality except for the large proportion of term coverage. But knowing about alcoholism's insidious role in trauma deaths and knowing about GGT, it is only a matter of time.

DR. GRAHAM: I can give you our select period mortality from trauma in 1981 and contrast that with 1984. In 1981 in the select period, the accident percentage was 18.8 percent; suicide was 4.7 percent; homicide was 1.6 percent; which all added up to 25.1 percent of all select period death claims in 1981. In 1984 accidents were 10.4 percent; suicide was 4.5 percent; and homicide was 3.0 percent. This adds up to 17.9 percent, which is a little less than 25.1 percent. So going from 25 to 17.9 percent we think, in part, is a result of our utilization of blood profile. I've yet to put together the numbers for volume, but I am sure they will correlate because we, like other companies, are examining everything. We are looking at our universal and interest-sensitive product world and doing the startling thing of lowering requirements.

MR. PETER S. KREUTER: One of the earlier tables showed that there was an overall worse profile for complete nondrinkers than for people who drink one or two drinks a day. Could you comment on that?

MR. GEORGE: There has been a great deal of controversy about that particular finding in the study by the Kaiser Permanente people. Recently, the American Journal of Medicine printed an article by a fellow who just could not keep silent about his frustration in knowing that teetotalers didn't live as long as light social drinkers. He published a rather thoroughly researched paper which demonstrated that there were probably extenuating reasons. Some of the reasons had to do with the proportion of people in the teetotaler group who had been cigarette smokers, which was not addressed, as opposed to the light social drinkers. Some of the things had to do with other lifestyle components in this population. The key question that remains to be answered is just what impact light social drinking (which stimulates the manufacture of high density lipoprotein) has on your risk of coronary disease. On that side, the heavy drinkers had a lower ten-year death rate from coronary heart disease than the teetotalers. There is a great deal of controversy about whether the alcohol-induced fraction of high density lipoprotein is preventative or whether it is a nonsequitur in the outcome of coronary disease. I happen to believe and certainly pray

that it is a factor. If that's true, it may account in fact for the reason why the teetotalers did less well than the light social drinker.

DR. GRAHAM: As a cardiologist, I look favorably at the initial reports in which the total HDL fractions were increased in people who drink lightly or moderately.

As we started to look at other apolipoprotein fractions, the HDL portion that you achieve by not smoking and by exercising is a better fraction than that which you obtained by drinking.

If you look at careful studies of nondrinkers, for example, a practicing Mormon group--and can separate out the nonsmoking aspect from the nonalcoholic use, you will probably see better mortality, but that population is impossible to achieve with the independent agent.