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RISK CLASSIFICATION TRENDS

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o This session will include a discussion of contemporary risk classification issues and trends with regard to the underwriting of individual life insurance risks.

MR. GREGG R. SADLER: Our first panelist on risk classification is Jack Paddon. Jack is a Corporate Vice President and Actuary at New York Life. He's a member of the Society Committee on HIV research, and chairs the Committee on Individual Life Insurance experience studies. He's also been a member of the Academy's Risk Classification Committee since 1986. This group developed the 1989 Actuarial Standards of Practice No. 12 on this topic. It also produced a slide presentation first given at the NAIC meeting in Las Vegas in December 1989. Academy members can use this slide presentation for helping audiences such as regulators, legislators and their staffs, the media, and sales groups better understand the basic rationale for risk classification.

MR. JOHN W. PADDON: Back in 1980, our Academy committee published an excellent comprehensive risk classification statement of principles. If you don't happen to have one, you might want to write or phone the Academy office and get a copy. Several prominent actuaries worked on this statement, including Barbara Lautzenheiser, Walt Rugland, Bill Halvorson and Harold Ingraham. These principles, which have not been changed since then, were the basis for the risk classification standard of practice. But despite this and many other efforts to present our side of the story, it's fair to say there is probably more public skepticism, suspicion and negative feeling about the risk classification process rather than less. This is because when risk factors are used as a basis to charge one person more dollars than someone else for the same insurance coverage, whether it's life or casualty or disability, this is viewed by many people as a social distinction that is unjust, unfair, misleading, discriminatory, and inequitable, any of those terms you can name, and that should be restricted or outlawed.

In the Academy's January 1990 *Actuarial Update* newsletter article about the slide show, it was stated that the script might be too basic and elementary an overview for actuarial audiences such as this one. But, from at least one standpoint, I don't really agree with this premise at all, because when we as actuaries are speaking out on this issue to legislators, regulators, sales people, the media, and especially the general public, we need to do this in the most clear, concise, coherent, understandable way that we can because nothing less will suffice in telling our story.

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Since this is an Academy slide show, it will have some casualty insurance references as well as life insurance. This reflects the current auto, malpractice and liability problems in a number of states, California particularly. Life and health actuaries also contend with items like age, gender impairments, and state of health to classify risks in separate price-distinct categories. This slide presentation, which outlines a rationale for risk classification, will deal with that as well.

Consider risk classification, the science and the fiction. It sounds like we're here for a science fiction retrospective. Not so, but I would like to direct your attention to one of the early science fiction magazines going back some 50 years called *Life Line*. This issue contained a story by Robert Heinlein. Now Mr. Heinlein was not an actuary, nor was he ever associated with the insurance industry, but he was a gifted writer. He tells a tale about a man who invents a machine, an early computer, which for a fee would compute a person's date of death. The inventor makes a fortune, and the life insurance industry collapses in short order. It's a well-crafted story, but it's science fiction. In the real world, as we know, there is no way to predict life's contingent events, such as death, disability, or car crashes with such certainty. Instead of Mr. Heinlein's futuristic machine, we rely on actuaries who make use of a powerful tool known as risk classification so that insurance companies can properly evaluate the risks they underwrite.

That brings us to our topic, risk classification. But I'm getting ahead of myself. First, a word from our sponsor, the American Academy of Actuaries, the voice of the actuarial profession to federal and state regulators, legislators and the general public. As actuaries we believe that no topic in our domain is more misunderstood and more in need of explanation than risk classification. Much more than an equation or symbol that gets lost in the mathematical shuffle, risk classification is a basic underlying principle of actuarial science.

Let's start with a definition. Risk classification is the process of grouping risks with similar risk characteristics so as to appropriately recognize differences in costs. This process is an integral part of the insurance business, and as such if it is misunderstood or misapplied, it can lead to adverse consequences. Risk classification, or to be more accurate, inappropriate risk classification, has been a significant factor in insurance company insolvencies in the United States.

So with apologies to Mr. Heinlein, let's delve into nonfiction and look at a real world example of how one insurance company collapsed. Prudence Mutual Casualty Company, yes, that really was its name, was a moderate-size casualty insurer located in Chicago. The company originally specialized in individual disability income policies. In the early 1970s, new management took over the company and decided to use its casualty authority to write auto insurance. The new management believed that people who lived in Chicago's blue collar neighborhoods were being unfairly discriminated against (remember that term, *unfair discrimination*), because they were being charged auto insurance premiums that were too high. Sounds a little familiar today in California, New Jersey, and some other places. So based on this belief, management ignored the actuarial statistics and evidence, and wrote auto insurance for drivers in these Chicago neighborhoods at rates that would have been right for a population with far fewer auto accidents. The result? You guessed it. Prudence Mutual went belly-up, and everyone involved got

hurt financially. All the company's lines of business were affected, including its disability income line. Many disabled individuals who had long depended on income payments from Prudence Mutual lost those benefits.

This is not just a story about mismanagement and its sad human consequences. It's also a story about the dangers of ignoring appropriate risk classification. Risk classification is a powerful analytic tool that must be clearly understood by all involved in the management and the regulation of voluntary insurance programs. It's a concept, furthermore, about which there is a good deal of confusion in the media and in the public policy arena. Why? Much of this confusion revolves around a single word that is often treated the same as risk classification. It's the word *discrimination*. In today's world, this word often has very negative connotations, but it's a word with several meanings, some negative, some positive. There is both fair and unfair discrimination. To an actuary, unfair discrimination creates inequity. It represents an unfair charge to one individual or group to subsidize another individual or group. Not all people are alike, not all cars are alike when they are running or when they are not. One residence is quite unlike another, and treating them both the same for insurance purposes is inequitable.

Systems of risk classification permit insurers to respond fairly to valid cost and experience related differences among persons or property. To help guide actuaries in developing these systems, the actuarial profession through the Actuarial Standards Board recently adopted a risk classification standard of practice (No. 12). This standard enumerates three basic requirements for an appropriate risk classification system, and these are right out of the principles that were developed in 1980: (1) Risk classification must be fair. (2) Risk classification must permit economic incentives to operate, and thus encourage widespread availability of coverage in the marketplace. (3) Risk classification must do its part to keep the insurer solvent.

To achieve these ends, a sound classification system should be based on four principles which are also spelled out in the actuarial standard. First, risk classification should reflect cost and experience differences. An example would be employers of coal miners will pay more for their unemployment insurance than employers of computer technicians because coal miners historically have much higher rates of unemployment. Second, the system should be applied objectively and consistently. By this principle, males of the same age with similar health histories should be charged similar rates for life insurance. Third, the system should be practical, cost effective, and responsive to change. This means there are limits on how much effort and money can be spent to classify a given risk, and risk classification systems are dynamic. For example, when polio was eliminated as a public health hazard, the system changed to reflect that development. Fourth, and perhaps the most crucial, antiselection should be minimized. *Antiselection* is an actuarial term that requires some further explanation. Applicants for insurance often know more about their own risk factors than the insurer can learn in the application and underwriting process. However, sound risk classification systems should limit the ability of the applicant to take an unfair financial advantage at the expense of the insurance company or other insurers. This unfair advantage in essence is what we mean by antiselection.

So far we've talked about some of the concepts underlying appropriate risk classification. Let's move on to some specifics of how this is used by actuaries. *Actuarial evidence* is a term that frequently appears in state and federal legislation, but what does it really mean? What is the nature of actuarial evidence? There are essentially two types of actuarial evidence. The best evidence is statistical analysis of information from actual insurance claims, how many claims filed and how much. Unfortunately, reliable claims data are frequently the last information available, especially when conditions are changing, like when there have been significant innovations in auto safety. In some areas there is better information available. For example, there's a large volume of insured claims data showing that experience is not the same for men and women for life or health insurance, annuities, or auto insurance. A second type of actuarial evidence may be drawn from engineering, clinical, or other types of studies. AIDS is a case in point. AIDS develops slowly and kills relatively quickly, but because it has emerged fairly recently, we don't yet have a large volume of insured data. But we do have substantial clinical evidence that indicates the likely extreme adverse affect of AIDS on future insurance claims. Of course, there are occasions when it's necessary to rely on subjective evidence, by which we mean informed actuarial judgment and common sense. Even in the absence of insured data, common sense would dictate higher casualty insurance premiums for fireworks manufacturers than for dairy farmers.

You'll notice that in discussing actuarial evidence, we haven't said anything yet about causation. Some have suggested that establishing causation should be a requirement for classifying risks. Let's consider whether this is necessary for sound risk classification. Sometimes we know that one event causes another. This person's aim with a hammer caused that problem with his thumb. That's causation. However, the inability to establish cause and effect is sometimes improperly equated with a lack of evidence for the relationship. We might not know exactly how smoking leads to cancer, but the relationship is very well-documented and certainly very clear because of the high degree of correlation between the two. Another example, it's obvious that females have lower mortality than males, but the cause for this is a source of argument. The lack of specific causation has led some to advocate unisex insurance pricing despite the substantial actuarial evidence of the validity of the gender distinction. But ignoring this evidence does not change it. With unisex pricing, one group will be charged more to subsidize the other group. Now if the actual cause for this mortality difference were to be found and it were practical to do so, we could then use this cause instead of gender in risk classification. What we have here is an example where the actuarial foundation of risk classification may be at odds with the public policy decision.

In recent years, classification factors like gender, age, marital status, and physical handicap have received a lot of attention by the news media, federal and state legislators, and by insurance companies themselves. In some cases, actuarial evidence, although clear, has been disregarded in an effort to improve perceived social inequality such as in the unisex example. In other situations actuaries are being asked to resolve social issues on the basis of evidence that is fragmentary or inconclusive at best. For example, some states have enacted statutes or regulations requiring that actuarial evidence be supplied before a particular group of handicapped individuals can be charged different life insurance premiums. There is, however, a dearth of actuarial evidence to support many of these mandated requirements, however worthy or

noncontroversial they may be. These mandated requirements can be viewed as manipulations of risk classification. In essence, we actuaries are being put in the position of justifying a predetermined public policy without sufficient data. If the social issues are complex, the risk classification issues are equally so, and mingling these two sets of issues makes for even greater complexity.

However, there is one distinction that is central to nearly every public policy debate that involves systems of sound risk classification. That distinction is whether equality is more important than equity. In the context of insurance and risk classification, equality means charging the same price to all buyers regardless of differences in the value or underlying cost of the benefits provided; equity means charging each buyer a price that is commensurate with the value of benefits to that buyer. In this context, imposing equality apart from equity leads to cross-subsidizing between groups. This can tend to drive away those buyers who believe they're paying too high a price. What's the result? Increased cost, reduced coverage, or perhaps no coverage at all for those remaining in the system, another Prudence Mutual scenario, if you will. The assessment spirals that bankrupted a number of life insurance organizations in the 1800s and early 1900s are a vivid example of this process at work. What happened? Costs increased dramatically, claims could not be paid, and finally all coverage was lost to everyone.

Providing equity within the system through appropriate risk classification maximizes the opportunity for insurance by making lower and more equitable prices more readily available to lower risks over a broader cross-section of people. Our risk classification standard of practice defines *equitable* as appropriately reflecting differences among the cost of identifiable risk characteristics. In other words, it is an honest reflection meaning impartial and fair. Now, would it be equitable to charge the buyers of insurance on two vastly different cars the same rate, or would it be a case of unfair equality? Increased equality is frequently a goal of social policy, and appropriately is a major concern of our legislators and regulators. As actuaries, we do not oppose equality in and of itself. However, the means by which it is increased can have unanticipated consequences, and in some cases results quite opposite of those intended. Because of our expertise, we believe we have a responsibility to encourage those who make public policy to understand the impact of a proposal or a decision on the insurance system as a whole. Because of our mathematical training the symbol (dy/dx) is meaningful to all of us. It is associated with a rate of change. Change is the one constant in today's world. Because we all operate in a dynamically changing and endlessly challenging environment, insurers, actuaries, regulators and underwriters must work together to keep these three basic requirements of risk classification from being lost.

Accordingly, they're worth repeating once again. Risk classification must be fair. It must let economic incentives work and so encourage widespread availability of coverage. It must keep the insuring organization solvent. We may not have Mr. Heinlein's futuristic machine available to us, but we have nonetheless a powerful tool. With risk classification understood and applied as it should be, we have a means for helping insurance companies properly evaluate the risks they underwrite ensuring that policyholders are safe and secure. So the Academy is grateful for the opportunity to share this presentation with you. If you'd like a copy of the script, you can contact Erich Parker at the Academy office. You may find the script and slides worthwhile, perhaps for a

National Association of Life Underwriters (NALU) group of sales people in your community, or if you work in or near a state capitol, for some legislative or regulatory organization.

MR. SADLER: I think your presentation is a very timely one. Its topic is one that's increasingly in the public eye, state insurance departments and state legislatures. Risk classification is coming under more and more scrutiny and attack, and it's important for all actuaries, underwriters, and anybody who works for insurance companies to be aware of the kind of information we can use to educate our various publics about the risk classification issue, which is the foundation of our business.

Our next speaker is Paul Howman. Paul is Assistant Vice President of Underwriting Research at Mutual of New York. One of his major responsibilities has been the development of an expert system that's now in use at Mutual of New York in the underwriting process. In addition to lecturing, Paul has written several articles that have appeared widely in publications such as *Resource Magazine*, *The National Underwriter*, *New Science*, *Business Insurance*, *On the Risk*, *Best's Review*, *The ALIMDA Journal*, *The New York Times*, and *The Washington Post*. In addition, Paul is very active in professional underwriting organizations. He's currently an officer of the Home Office Life Underwriters Association (HOLUA), and he serves on the Procedures and Cost Committee, which is a joint committee of HOLUA and the Institute of Home Office Underwriters. Paul will discuss the evolution of risk classification.

MR. PAUL HOWMAN: In the first part of my talk I am going to define, from an underwriter's point of view, what we see and define as risk classification. I was not previously aware of what Jack's talk was, and I would ask you to pay some specific attention to see where the similarities are and maybe where some differences are. Underwriters see risk classification as the process of determining the insurability of proposed insureds and then, if insurable, assigning the proper rate classification to that risk. As you know, each classification represents an anticipated range of mortality results. It's the underwriter's responsibility to assure that the level of the risk involved with each case represents the company's pricing philosophy and the mortality range anticipated by the classification selected. Proper rate classification is essential. Inadequate rates will impair our financial results through either (a) adverse mortality results, or (b) as was referred to earlier by Jack, deliberate antiselection. Again because the buyer's purchase of insurance is optional, underwriters must always be cognizant of the fact and the possibility of antiselection. On the other hand, excessive rates may also impair our financial results by either (a) driving away good business, or (b) causing poor field force morale and thus resulting in lesser sales. The primary goal of the risk classification process is to maintain equity among proposed insureds by charging an amount commensurate with the risk it represents. As Jack just stated the basic premise of life insurance is that individuals assigned to the same rate classification must present similar risk profiles. The underwriter must perform all of the above tasks with the least amount of underwriting information necessary to properly evaluate that risk on a timely basis, always being cognizant of the field force's needs, demands, and pressures. The underwriter's expertise is best demonstrated when performing all of these, oftentimes mutually exclusive, goals to reach the appropriate final action on each and every case.

So how does the underwriter determine the insurability of a proposed insured? To explain this I would like to walk you through what underwriting has been and still is at the majority of companies today, how technology is starting to change this process, and how this process will become the acceptable practice for the survivors of the future. Historically, the underwriting process has been manual, paper driven and very labor intensive. The analysis starts with the manual review of the paper application, the agent's report, previous internal insurance records, and results from the Medical Information Bureau or as we refer to it, MIB. During the underwriting review process, the underwriter analyzes about 12-14 major risk categories, such as, insurable interest, financial justifications for the amounts being applied for, the occupation and employer, the smoking histories, and the medical histories, paying special attention to see if all of it makes sense depending on the person's age and sex, and the underwriter determines if there are any adverse driving histories and/or aviational and avocational activities. At the same time the underwriter is considering all the age and amount requirements, the state regulations, the appropriateness of the plans and the riders being applied for, the persistency characteristics, and the overall quality and characteristics of the information being presented. In order to fully complete this review, the underwriter is required to wear many hats. These hats include at times being a doctor, a lawyer, a marketer, a financial analyst, a claims analyst, a listener, and an educator. When the review is complete, the underwriter requests the information necessary to properly determine the mortality risk and appropriately classify the applicant. This underwriting information can be based on age and amount, on underwriting judgment, and on legal requirements. The request for this information is often manually prepared and mailed to our vendors for their services. As each requirement is completed, it is mailed back into the home office, manually receipted and attached to the file. It is then walked to the underwriter for manual review. The underwriter evaluates the requirement to determine (a) if it is acceptable, (b) if it's going to cause any increase in mortality, and (c) if additional information is going to be necessary or if final action can be taken on a case.

It is not uncommon for an underwriter to see a large amount case on an older applicant at least 12 times before he can take a final action. Once all the required information is received, the underwriter reevaluates the entire case to affix a final risk classification. Part of this decision-making process is based on statistical mortality studies from past experience; part is based on present information pertaining to new developments in medications, surgeries, life styles, occupational safety, and environmental issues. There are situations where we don't have any reliable mortality statistics. These can be unavailable because the impairment has not happened with enough frequency, or because the impairment has been uninsurable and we do not have any data. In these instances, the underwriter must rely on his expertise to make sound, educated judgments about future experience. Of course, underwriting, being an art rather than a science, can at times produce differing opinions as to the proper workup or final classification of the case.

This basically is what underwriting has been for more than a century. Yes, the underwriting requirements have changed, the products have changed, the type, quantity and quality of the information we get has changed, regulations have changed, life expectancy has changed, but the process of underwriting has basically remained the same. That is until recently. Now with new technologies, the underwriting process is going through a

dramatic but positive evolution. To help explain this evolution, I would like to tell you about our Comprehensive Life Underwriting Expert System (CLUES).

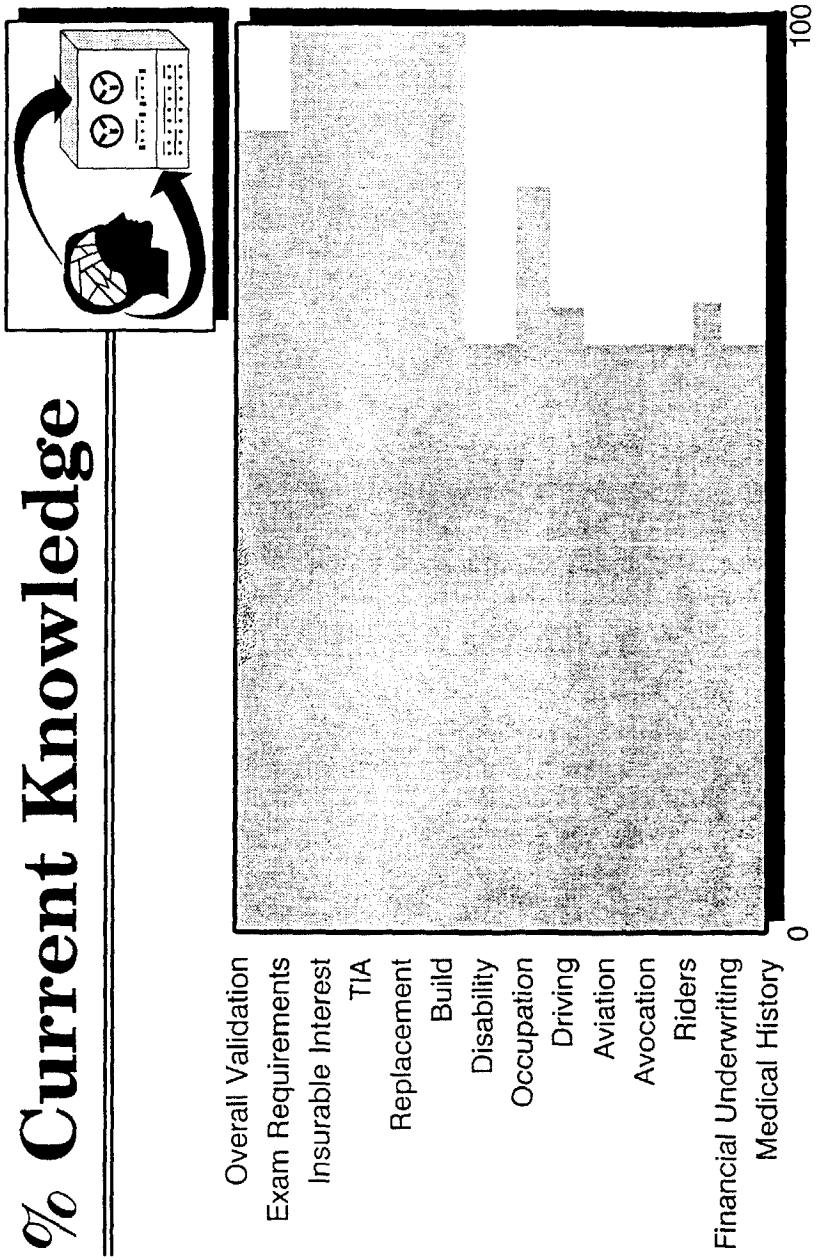
CLUES is a comprehensive system which embodies multiple mainframe systems, and is capable of performing the life underwriting function totally on its own. It is categorized as an expert system because it is based on artificially intelligent software and knowledge bases. In order for the expert system to perform the underwriting function, it must have knowledge about all the various aspects, conditions, rules and regulations previously mentioned, which have to be considered each and every time you evaluate a new business application.

The vertical axis in Chart 1 represents those areas of knowledge which have been programmed into our system. TIA is our temporary insurance agreement. The horizontal axis represents the entire domain of our underwriter that we used as our expert with 100% being everything he knows. What's in the shaded area is what percent of his knowledge we have now programmed into the system. What's in the unshaded area is the knowledge that he has that our system doesn't know about. When we designed this system, we purposely designed the system to only be able to take actions on things where it knew everything. If it came across any situation that would fall into the unshaded area, it would have to refer to an underwriter. Our goal, of course, is to keep moving the shaded area out towards 100%, but knowing we will never be able to push everything to 100% because it just doesn't make sense. You get into what oftentimes is referred to as the 80-20 rule where suddenly you will be spending 80% of your time for 20% of the benefits, and I'm sure you can find better places to spend that money.

In the initial design we wanted to make sure we pushed at least a couple areas all the way out to 100% so that we knew the system could facilitate all the knowledge if we wanted to push it there. One of those areas we pushed out was insurable interest. Now when you first think of insurable interest, you think, so what? Is there insurable interest or isn't there? But when we were doing our knowledge acquisition, and we started looking at the fields of beneficiary, rights holder, premium payor, and applicant, while at the same time considering the person's age and marital status, we came up with 1,750,000 potential combinations of relationships. Of those, we identified over 300,000 that represented a legitimate insurable interest, and the system has knowledge of all 300,000; which ones are okay and which are not okay.

This brings us to what the system actually does. CLUES reviews electronically the same information previously presented to the underwriter manually, that is, the application, the agent's report, our policyholder database information, and MIB. CLUES utilizes all the areas of knowledge that I had in Chart 1 to determine if a case can be approved and released, or if additional underwriting requirements are necessary. Additionally, CLUES processes natural language. Our data entry people are able to input into the system exactly what they see on the application. They do not have to look occupations up in a table, or codify medical histories. It's up to the system to be able to determine the proper meaning of each word depending on the context of the sentence in which it's being used. This feature significantly differentiates this system from any other system that we know of today.

CHART 1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Exam Requirements
Insurable Interest
TIA
Replacement
Build
Disability
Occupation
Driving
Aviation
Avocation
Riders
Financial Underwriting
Medical History
0
100

Although the processing of natural language has been one of the most rewarding parts of the system, it also created difficulties throughout the development of CLUES and definitely has become one of the most expensive modules of the entire system.

CLUES can automatically approve nonmedical applications for amounts up to $250,000 providing no mandatory underwriting requirements are necessary. The underwriting, approval and issue process is done without any human review or manual intervention. We did design the system to be able only to approve standard cases and take positive actions. We felt it was a strategic requirement that our field force have the ability to talk to an underwriter any time there was an adverse decision. Additionally, for those cases the system is unable to approve, it completes a full workup of the case, and acts as an advisor to the underwriter making sure all age and amount requirements and state regulations have been met. It relieves the underwriter of all tedious research on each and every case. Additionally, CLUES recommends actions, suggests requirements necessary for the appropriate workup, and suggests ratings. However, the final action in each of these situations is always up to the underwriter. CLUES does ensure that each case has received full consideration and no extenuating circumstances are ever overlooked.

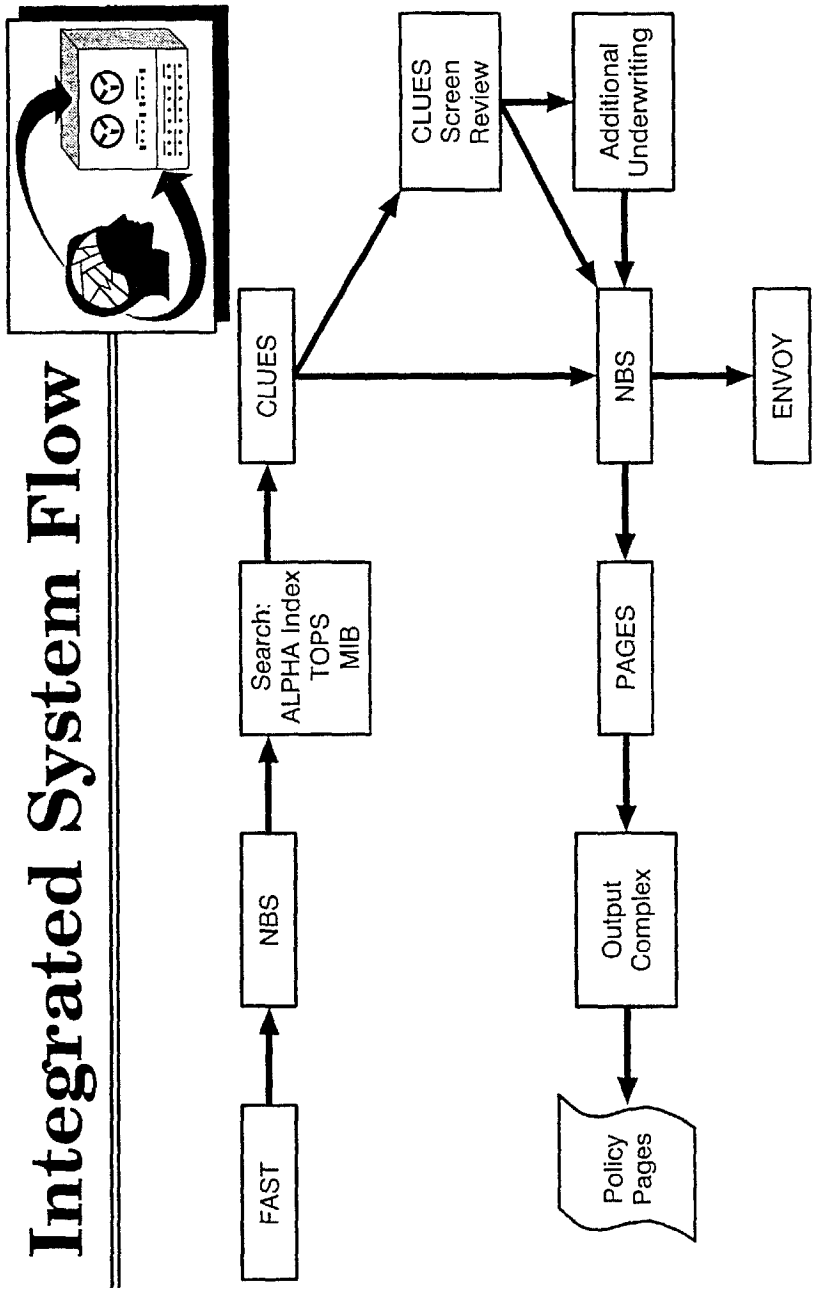
If CLUES does not approve the application, it will electronically refer the application to the underwriters based on their authority, their work load, the part of the country they're working on, their schedules, their vacations, and the difficulty of the case. CLUES knows, if it comes across an impairment like diabetes, which underwriters are fully trained in diabetes and which ones aren't, and will only assign the case to the true expert. The underwriter is then able to review the entire application electronically along with the reasons for CLUES failing the case, and the recommended actions by CLUES. We refer to this function as the screen review system.

CLUES does allow us to reduce the time required to process an application for individual life insurance. We are now not only providing a benefit to our field force, but also we are fulfilling the proposed insured's needs much more quickly. In order to perform all of these functions in the underwriting process, CLUES was required to be integrated into several of our other mainframe systems described briefly.

The FAST system is a system which allows our agencies to submit applications directly from the agencies to our home office. This system is designed for the occasional user, and has a lot of help screens behind it. Our new business system (NBS), is a system that each and every new business application is entered into. It is the heartbeat of our operation. It does all the tracking, follow up, and validation for all applications. ALPHA and TOPS are both in-force databases. CLUES is comprised of actually two systems: the knowledge base part of it, which does the underwriting, and the screen review system. ENVOY is our electronic mail system; that's our link to our agencies. PAGES and OUTPUT do the printing of our policy pages.

Chart 2 is a visualization of how a case would actually flow through the underwriting process today. The application can be entered into FAST either from our agencies or from our home office in Syracuse. If the agencies want to enter the applications locally, they can. If they want to mail them in to us, we will do it.

CHART 2


Integrated System Flow
FAST
NBS
Search:
ALPHA Index
TOPS
MIB
CLUES
CLUES
Screen
Review
Additional
Underwriting
NBS
ENVOY
PAGES
Output
Complex
Policy
Pages

After the new business system has set up the record, completed the validation, and verified that it is a legitimate application, we automatically go off and search the MIB database in Boston, and do an ALPHA and TOPS look up. Once this information has come back, we match it to the file and send it to the part of the CLUES system that is the knowledge base part of the system. CLUES goes through the entire underwriting process. If it determines that the case is acceptable and can be approved as applied for, it will send a release transaction to the new business system. The new business system will automatically send an electronic mail message to the agency and agent telling them that the case has been approved, and will trigger a release using PAGES and OUTPUT to mail the policy.

For cases that go through this process, which today represent about 55% of our nonmedical business, there is no paper handling or manual intervention. At the time the policy is being printed, the actual application is either still out in the agency, or sitting on our servicer's desk who input the data. What this means is that, for a case which has been input by an agency in California or Hawaii, 12 minutes later that agency has the electronic communication back saying the case is approved. The agent has the policy the next day in the agency to deliver to the proposed insured. For cases that CLUES determines it cannot approve, either because it doesn't know everything about the case or it finds a problem with the case, it will electronically refer that case to the underwriter through the screen review system. In this system the underwriter is able to review the entire application, the reasons CLUES failed the case, and the recommended workup action by CLUES via computer terminals. We give enough information to the underwriter to make a judgment call in this system without actually having the paper application. If the underwriter decides to approve the application, he can override the CLUES decision and send a message to NBS to release the case. NBS then sends a communication to the field force, and initiates the printing of the policy. In this circumstance, although we've had manual intervention, we still have had no paper flow, the application itself would still be in the agency or on some servicer's input desk. If the underwriter decides that additional underwriting requirements are going to be necessary to work up the case, he can request all of them through the screen review system, automatically update the new business system to do the follow up and tracking on the additional requirements, and send the ongoing message out to the field force that the requirements are necessary.

Additionally, we have a process at MONY which we call conditional release. If CLUES is working up a case and sees that the case looks like it's standard, but needs age and amount requirements that don't become part of the policy, it can send a conditional release message to NBS. NBS will conditionally release the policy, send an ENVOY to the agency, telling the agent the policy is being conditionally released but to hold it when he gets it. The system then prints the policy and has it mailed. The policy sits in the agency until the requirement comes in and is reviewed. If released, the agent can deliver the policy, otherwise it will be returned for a rating because of adverse information that was found. Today because we're linked with our laboratories electronically, when our blood requirements come in, the system automatically reviews the requirements of the blood, and if they are normal and the case has been conditionally released, we'll turn that conditional release into a full release without any underwriter having ever seen that application.

So what are the benefits of this? Well, first of all, as I hope you can appreciate, it has motivated our field force. Service has become a marketing niche for us, and we have definitely seen increased production due to the positive attitudes from our field force.

Another benefit is increased capacity. Because CLUES can automatically approve applications, issue policies, recommend actions to the underwriter, and preload the underwriting requirements that are necessary, we can process more business with less people. Not only can we do this, but also our underwriters have a better job satisfaction. They no longer have all the boredom and mundane labor intensive tasks that they had in the past. Additionally, this system or systems like this are able to work 24 hours a day, 7 days a week, if and when necessary. This as we have seen is especially helpful and critical during crunch periods, contests, year-ends, whatever. Since deployment of the system, CLUES has underwritten approximately 175,000 applications, it has issued about 60,000 of those totally on its own, which represents volumewise about $1.75 billion worth of life insurance.

A third benefit is consistency. Expert systems don't forget. They don't have Monday morning blahs or Friday afternoon blues. Expert systems help ensure that our underwriters always analyze the same basic data the same way, which prior to this system, was almost impossible for us with an operation our size. Also, any changes are immediately applied across the board, and we have no learning curves or people forgetting about a new rule or procedure. This increased consistency can help us maintain equity among the applicants, which will help our fight against unfair discrimination with the legislators, you the actuaries in pricing our products, and the field force in knowing what to expect from us.

Retention and dissemination of the expert's knowledge is a fourth benefit. We now have our best underwriting expert with all his knowledge and experience review each and every new business application, applying all his years of expertise and judgment to reach a final decision on the case. That knowledge cannot leave us, but we control it. We can update it, we can change it. To give you an example of what it means to us personally at Mutual of New York to have had this, last year we went through an early retirement situation. In our chief underwriting unit, which only underwrites the jumbo cases, three of six underwriters took early retirement. Because we had captured their knowledge by using the chief underwriter as the expert, we were able to go on processing business without a glitch.

A fifth benefit is research. Because we are now entering data from every field off the application into our systems, all these data are now available for reporting and research purposes. This allows us to more easily examine our results, perform cost benefit studies, better control our expenses, and react faster to trends. Additionally, it should allow us to reduce our underwriting requirements, which means reduced expenses and faster processing for the field force, plus improved ability to analyze claims.

An expandable knowledge base is a sixth benefit. This system was designed as most expert systems are so that the knowledge base is easily expandable. You don't need 100% of the knowledge in the system day one. To give you an example, when we first deployed this system, it was approving about 5% of the nonmedical business on its own.

Six months later we had that up to 15%; today we have it up to 55%. The key issue is this system does not program on its own. Instead it tells us what it doesn't know so we can decide how to program that knowledge in it, and what that will represent to our underwriters.

A final benefit is faster time service. We have definite improvements and faster time service in three areas. Those three areas range from submitting of the application to the underwriter's first initial action (75% of the business is now done the same day), submitting of the application to the final underwriting action, and submitting of the application to getting that policy in the agent's hand.

CLUES is in production today, and the benefits are a reality. However, I believe the future is even brighter and more exciting. We already have central processing unit (CPU) ties with such places as our labs, so that we can get results of blood tests, and with vendors who can provide motor vehicle reports. Additionally, at least one major vendor is now committed to providing results from inspection reports and exams to us electronically. In the future, we will be tied CPU to CPU to all our major vendors to get all our major requirements, to include the electrocardiograms and doctor's reports. What will this mean to us? The future systems will be able and allowed to automatically order, receipt, and match the requirements to the pending applications electronically without any manual intervention. But even more important than that, because we will be getting the information in data format, the systems will be able to analyze and interpret that data and only refer the information to the underwriter which is of potential underwriting significance. Of course, the underwriters will always have the ability to review any and all the data they want on any individual case. Additionally, the underwriter will be assisted in the evaluation of complex medical impairments through the use of expanded, fully interactive expert systems. These new systems will contain all the information currently printed in all the underwriting manuals plus the medical department's expertise. The underwriters will be able to input any medical impairment or condition, and the expert system will assist them in the workup of that impairment making sure it is evaluated in a manner consistent with the assumptions used to develop the rating schedules in our manuals.

What will these new features add to the benefits of tomorrow? They will provide value added productivity. As I mentioned earlier, today's systems are removing all the mundane, error prone tasks from underwriting. These future systems will remove all the routine processing from the underwriting function allowing our underwriters to concentrate only on those cases and/or impairments which require their special expertise for complete and proper evaluation. The underwriting function will become much more difficult, interesting, and challenging. In addition to all the professional hats I mentioned earlier, the professional underwriter will be required to wear yet a couple more hats. Underwriters will be required to understand, work effectively with, and explain advanced systems plus they must be aware of and utilize each and every day the pricing assumptions relative to both mortality and expenses. This approach of evaluating all data electronically can almost assure consistency of underwriting decisions. A recent article published in the March 31, 1989 *Science* magazine entitled, "Clinical Versus Actuarial Judgment" by Dawes, Faust and Meehl, underscored the value of consistent decisions when it revealed that an expert panel of psychologists had more success in making an

accurate diagnosis between neurosis and psychosis when a formula was used to develop their criteria. Consistent decisions will produce expected expense results and mortality results. Both of these functions will be our major contributors to improved mortality results in the future. Additionally, the accuracy of the risk classification process will be enhanced by assuring that all vital elements of information critical to making the decision are considered. These results will be more easily controlled, and hence our companies will be able to produce desired mortality results be it more liberal or conservative. These additional data, together with the existing ability to evaluate the protective value of underwriting requirements coupled with systems capable of evaluating all the information from our vendors, will give corporations for the first time the ability to manage data on a global basis. This ability will allow current results, not past results, to be analyzed, directions to be changed, and new rules, regulations and requirements to be implemented and applied across the board immediately.

Elements of these data will be valuable and even critical in your daily business activities whether your responsibilities as an actuary are pricing, product development, mortality, reinsurance, commissions, persistency, or the actual corporate financials. The cry of the 1990s is to get back to the basics. The full financial service provider is on hold at best. Our agents and proposed insureds are looking for financially sound corporations that can provide excellent service. The companies that successfully automate the underwriting process, provide excellent service, and have the ability to effectively manage mortality results and data will be among tomorrow's leaders. The insurance business is becoming more and more complex and will require not only the strong management skills that we have always relied on, but also we'll all have to understand our business better be it underwriting and issue, actuarial, investment, policyholder services or marketing. Now more than ever we need to educate and support each other to become better and smarter at what we're doing. In order for us to effectively manage mortality results in the future and realize the full benefits of this additional data that we will have available for reporting purposes, we need to form strong partnership relationships between the underwriting and the actuarial departments.

We recently at Mutual of New York completed a major mortality study. Because we have a strong partnership with the actuarial department, we were able to work together to provide meaningful results in a usable format. With these data, we are now able to use today's underwriting practices knowing what tomorrow's mortality results will be to reprice our products and set new dividend schedules. Do you need this type of partnership to function? Of course not. We all know of companies where underwriters haven't been in the actuarial department for a year or two, or actuaries in the underwriting department. In fact at some of the companies, the two groups probably haven't even talked. Are these companies functioning? Yes, but at what expense? How can the actuaries develop and price new products, set dividend schedules or get reinsurance bids not knowing what the underwriters are doing? How can I set underwriting requirements, make up rating schedules for impairments, or make exceptions on cases not understanding the pricing assumptions or truly knowing the mortality goals? Organizational structures almost preclude partnerships from happening, or is that just our excuse? Admittedly, forming these partnership relationships is a lot more difficult to do than to talk about, but we must do it. Hopefully, the mere fact that I'm here presenting at the Society's seminar on risk classification is a start. We need more actuaries attending and

participating in our underwriting meetings, and more underwriters attending these meetings. In today's environment we no longer have the time or the money for the "we" and "they" days. I believe the success stories of the future are going to need Renaissance men and women relying upon strong partnership relationships to make the successes happen.

MR. SADLER: I certainly agree with your remarks that a strong partnership is needed between actuaries and underwriters. Communication is absolutely essential.

Our next speaker is Rick Bergstrom. Rick is a consulting actuary with Milliman and Robertson (M&R) in Seattle. He specializes in product development and analysis of related issues that impact the company's underwriting and marketing strategies. Following a brief stint as an aerospace engineer, Rick began his actuarial career with Mutual of Omaha, and later moved to Dallas where he spent five years with J. C. Penney Life and Great American Reserve. He's been with M&R for the past six years. He's a frequent speaker at life insurance forums including SOA seminars and life company agency conventions. In 1988 he co-authored a research paper on projecting AIDS mortality, and last year he completed a landmark research study on the cost effectiveness of laboratory testing for insurance purposes. Rick's subject is the protective value of laboratory testing.

MR. RICHARD L. BERGSTROM: About a year ago, M&R in conjunction with the Home Office Reference Laboratory (HORL) began to develop a study that we hoped would help highlight the value to insurance companies of the laboratory testing in their underwriting processes, not only to highlight this, but to define it and demonstrate ways to measure the value of it.

As the study began to unfold, we decided that there were three ingredients that would be necessary to complete our work. The first was we needed a base of statistics, and to this end we approached the HORL people with an idea to let them share with us their statistics on the information that we needed. The second was a way to interpret these statistics, and the third was, in order to put value to this, we needed a means of measuring the cost of the actual testing itself. Now in conversation with the HORL folks, we were able to get items one and three, but for item number two, we went elsewhere. We decided to devise a survey that could be distributed to medical directors and underwriters which solicited their input regarding the underwriting significance of various tests that were outlined in the survey. Specifically, we sent the survey to 35 medical directors and chief underwriters to solicit feedback for various ranges of laboratory blood and urine tests, and more specifically, we wanted to consider blood chemistry profiles for such things as liver enzymes, cholesterol and other blood lipids, renal functions, glucose tolerance, and of course, HIV antibodies. Regarding urinalysis, we asked for input on a number of items, but specifically on nicotine and cocaine.

On the survey that we sent out the first two items were HIV positive and cocaine positive, and then we go into a number of other items. As I said, this survey was sent to 35 different companies, and the survey recipients were asked to underwrite each of the conditions shown in the survey by rating the various blood and urine abnormalities according to their own companies' standard underwriting guidelines and procedures. For

example, a response of 50 debits was indicative of a Table B risk, where expected mortality was 50% higher than assumed for standard risks. Then the survey responses were sent to me for compilation of the results. Now most of the surveys were returned, but as you might expect, a tally of the individual responses showed there was range of values for most of the tests. There was a single value in two specific cases. There were unanimous responses for HIV and cocaine, and of course, those responses were a total rejection of the risk. The ranges of underwriting reactions were not totally unexpected for a couple of reasons. First, in spite of the fact that underwriting guidelines have risen out of a large body of knowledge over the years, I think there's considerable uncertainty still as to what the long-term effect on mortality is in a number of conditions, particularly those conditions that are treatable. And second, I think the reference "standard" mortality does and will vary from company to company, and as a result, the meaning of a certain number of debits for example is not truly a standardized notion. So whereas one company may rate a risk at Table B, another company with its standards may rate the applicant as a standard risk.

In our projection, we calculated our average number of debits from the survey responses, and applied these debits to the 1975-80 Basic Select and Ultimate Tables, which we modified to reflect more recent experience since 1980. Let me describe our basic approach to the study. First we determined what the basic incidence was of the various abnormalities in the database, and given that we projected the expected excess of premature mortality for each test result in the survey based upon the average of the survey responses, and finally we summed the results of each condition to determine what the aggregate excess mortality was for all of the tests at selected issue ages. To simplify our approach, we made two other basic assumptions. The first was that the test results could be considered mutually exclusive events, and the second was the impact on mortality is at least additive for multiple abnormalities. Then in formula form, we attempted to determine the present value of excess mortality. What we're searching for at this point is a value for a Q which is defined as the difference between Q-1 and Q-2. Q-1 represents the present value of the substandard mortality, and Q-2 the present value of standard mortality. We also included in our present value calculations a persistency factor. A little later on in the presentation, I'll show you some sensitivities of our results to different lapse rates, because a number of people raised questions about the level of lapse rates. But for purposes of the basic study, we used 30% lapses in the first year grading down to 12% on an ultimate basis.

We defined $Q' = Q \times P \times S \times T$, which is our actual mortality savings for $1,000 of insurance applied for. We've defined Q as (Q-1) - (Q-2), but we've modified that by three factors. The first factor, which I've called P, represents the prevalence rate, and it varies between zero and one. In other words, how prevalent the condition is out of all the risks that you've looked at. The second factor, S, is what I called the test sensitivity. It also varies between zero and one, and it's a measure of how accurate the test is in picking up a specific abnormality. For purposes of our study, we assumed that S was equal to one. The last factor, T, is the savings attributable to that specific test, and again for our study, we assumed this value was equal to one. For blood and urine tests this is I think a fair approximation. If you were investigating other tests, EKGs for example, you might wish to choose a factor somewhat less than one because there may be other ways you could identify a heart condition without using just an EKG. And finally, we

summed each of the independent Q's to get our final result as far as present value of excess mortality. This value can be considered to be the savings anticipated by an insurance company for making underwriting decisions based upon the results of laboratory testing. To translate these values into face amount thresholds, above which laboratory testing becomes cost effective, we need to divide the cost by the savings.

What I've done is summarize by age group the first set of results. Actually I used a specific age 25, 35, 45 and so forth, representative of age groups 20-29, 30-39, etc. We got four different summarizations of value. The first is the paramedical exam plus the urinalysis test. In this specific case for $100,000 of insurance applied for, our present value of mortality savings is indicated as $32. There are three other categories, the blood test, the cocaine screen, and the HIV antibodies screen. For issue age group 20-29, the total savings that we derived is $259. Now watch how the trends appear. For ages 30-39, the paramedical plus urinalysis is $64 in savings, blood is $52, cocaine $18, and the HIV antibody test is $152, but the total now is up to $286 at issue ages 40 to 49. You'll notice that the paramedical, urine and blood values are rising as age increases, whereas the cocaine and HIV antibodies screen values are declining as age increases, but the total value is still increasing as age increases. For ages 50 to 59, the total is now up to almost $800 for $100,000 of insurance applied for, and for ages 60 and over, we derived a value of about $1,400. Now we used a range of the basic costs for laboratory testing. For the paramedical exam we felt reasonable to use a value of $40 to $50, and for the laboratory analysis, somewhere between $25 and $35. This includes the complete blood profile, urinalysis, HIV, and cocaine screens. Thus the total cost to a typical life insurance company might be somewhere within the range of about $65 to $85 per applicant.

At this point you're probably wondering what it all means. Next is the culmination of the work we've done so far: the threshold policy size needed to break even, or another way of saying this is, at what point is the laboratory testing cost effective to the company with a trade off or cost for the testing versus the anticipated future mortality savings? The thresholds are quite low, $29,000 being the highest amount at the youngest ages and grading down to virtually zero at the older ages. And I would venture to guess that there are very few companies out there that are adhering to testing limits of this nature or even two to three times these levels.

Another way of valuing testing separately from threshold limits might be to think of an underwriting investment being made during a given year equal to the cost of testing with the return to the company equal to the present value of mortality savings over the next 20 years. The return to the company for its underwriting investment might be seen as follows. Returns on investment (ROIs) are values that are on an annual basis, so we've got values that range from 52% for small policy sizes of $25,000 and over, up to 215%. This is per year for a large amount of policies. To give you more of a flavor for what type of return you might expect, look at changing your testing limits. If your company is currently testing at say $150,000 and you wanted to drop your testing limits down to $100,001, the return for that change alone is 75% on an annual basis. If you want to go from $100,001 down to $50,001, you still get a 49% return, and even going down to $25,001 you're looking at about a 40% return. Now we tried to do this analysis using assumptions that if anything would err, it would be on the conservative side. But even if

the sum total of all of our results were off by as much as 50%, I think it's very clear that the laboratory testing would still be many times more what a company would normally set for itself as a profit margin.

I want to make just a few more comments about AIDS and cocaine separately. What we have is the number of HIV positive tests on a per 100,000 applicant basis that HORL had in a portion of its 1988 applications that it tested. There's 126 per 100,000 at the issue age range 20 to 29, and that grades down to about 42 per 100,000 at ages 50 to 59, with a basic aggregate of about 88 hits per 100,000, and this is tested business that we're talking about at this point. It's generally believed that there are somewhere between 1,000,000 and 2,000,000 HIV infected individuals in the U.S. today, which translates then to roughly about a 600 for 100,000 population ratio. We felt that untested business was not the true number we wanted to use in our study, but we felt the tested business also was not the true number we wanted to use in our study. So we used values which fall between the accepted presumed number of HIV infected individuals and the tested number, which we derived from the HORL statistics. So at the youngest ages we've assumed about a 500 per 100,000 applicant ratio which grades down to 70 per 100,000 at ages 50 to 59 for an aggregate of about 340 per 100,000 compared to the HORL tested aggregate of 88 per 100,000, and the presumed U.S. population aggregate of 600 plus per 100,000. Now we computed the values for HIV and cocaine slightly differently than we did for some of the other tests. Specifically, we looked at two studies in coming up with a value for HIV. One was the Cowell-Hoskins study, and one was the M&R internal study that we used to develop projected mortality for AIDS. Both were fairly close, so we rounded it off to a value of 40,000 per $100,000 of insurance.

As far as cocaine goes, let me just go through a few of the statistics we got from HORL. This is also on a basis of 100,000 applicants tested, and at the younger ages almost 1,500 or 1.5% of the people tested positive for cocaine. As you might expect, that did grade down as age increases, but we weren't quite sure what to use for mortality because no one has mortality statistics for cocaine. So we assumed the following substandard tables by age group, and graded the tables down as age increased. A Table 16 at the youngest ages provides you with a fair amount of extra mortality, but a Table 16 at the older ages would provide a number greater than one, so we had to grade the tables down. We felt these were appropriate numbers. It's also of some interest to note that these values were roughly two to three times higher than what our assumed prevalence for the HIV antibodies were.

Since the study was released last fall, the phone hasn't stopped ringing. I've received calls from various sources questioning, and rightly so, a number of things, but mostly the assumptions that we used. Would it have looked the same had we assumed this instead of that? So I want to share with you a few things we've done since the study was released to indicate what might have happened had we used a different assumption or set of assumptions for such things as mortality and lapse rates, if we had a smoker honesty question involved in the survey, and of course, HIV prevalence.

Table 1 is the return on investment we calculated for the various age groups using a specific policy size of $100,000 with testing cost of $75.

TABLE 1

Sensitivity Assumptions

Base Case:		
Average Policy Size Testing Costs	$100,000 $75	
Results:		
Age Group	ROI	Age Distribution
20-29 30-39 40-49 50-59 60+	35.0% 39.0 61.0 108.0 192.0	17.5% 38.5 28.0 11.0 5.0
All Ages	60.0%	100.0%

I've also included here an age distribution just so I could come up with an aggregate total. For the youngest age group at $100,000, the company is achieving a 35% return on its investment. This, of course, grades up as age increases to about 192% at ages 60 and over, and I've concluded that the aggregate therefore is roughly 60%. This is what I'll call my base case.

The first sensitivity that we tested to this was the mortality assumption, and in the study we had assumed that mortality after issue would deteriorate at about 2.5% per year because of the fairly high lapse rate that we assumed in the study. This assumption was questioned by more than one person, and so what I have done is come back with two alternatives: alternative one assumed that there was no deterioration in mortality after issue, and alternative two, which is quite aggressive, assumed that there was actually mortality improvement of 2.5% per year after issue.

So comparing the totals of alternatives one and two to what I call my base case (Table 2), the totals show that under alternative one the ROI did indeed decrease from 60% to 54%, and under the more aggressive assumption, alternative two, it further decreased to 50%.

Table 3 shows the sensitivity to lapse rates. Again our base case was a 30% lapse rate in the first year grading down to 12%, the ultimate rate. For alternative one, I started out at a 25% lapse rate and graded that down to 8%, and for alternative two, I started at 20% and graded that down to 5%.

Looking at the totals on the bottom, the ROI calculations are quite sensitive to the choice of a lapse rate increasing from 60% to 76% under alternative one, and jumping to 97% for alternative two.

TABLE 2

Sensitivity to Mortality

Base Case: 1975-80 Tables with deterioration of 2.5%/year Alternative 1: No deterioration Alternative 2: Mortality improvement of 2.5%/year			
Results:			
	ROI %		
Age Group	Base Case	Alternative 1	Alternative 2
20-29	35	34	33
30-39	39	36	34
40-49	61	54	49
50-59	108	95	85
60+	192	178	165
All Ages	60	54	50

TABLE 3

Sensitivity to Lapse Rates

	Lapse Rates %		
Duration	Base Case	Alternative 1	Alternative 2
1	30	25	20
2	18	15	12
3	14	12	9
4 +	12	8	5
Results:			
	ROI %		
Age Group	Base Case	Alternative 1	Alternative 2
20-29	35	38	42
30-39	39	47	57
40-49	61	81	106
50-59	108	149	201
60+	192	250	320
All Ages	60	76	97

Now I felt it wouldn't be fair to do both of those in a vacuum, so I decided to put them together in Table 4 with the understanding that the base case represents the high lapses that we assumed combined with the mortality deterioration that you might expect in a high lapse case scenario. Alternative one assumed the middle lapse rate scenario, 25%, graded down to 8%, combined with a mortality scenario of no mortality deterioration, and alternative two is the low lapse scenario situation combined with the mortality improvement scenario. So we've got two things going in opposite directions, but the sum total under alternative one shows that the ROIs actually increased now from a base case of 60% to 68%, and under alternative two up to 76%.

TABLE 4

Sensitivity Combinations

Base Case: High lapses, mortality deterioration
Alternative 1: Middle lapse rates, no mortality deterioration
Alternative 2: Low lapse rates, mortality improvement

Results:

	ROI %		
Age Group	Base Case	Alternative 1	Alternative 2
20-29	35	36	38
30-39	39	42	45
40-49	61	69	77
50-59	108	128	150
60+	192	232	277
All Ages	60	68	76

I have a couple of comments about nicotine and HIV. In the survey we sent to the medical directors we asked a question, what percentage of applicants do you think would lie about the smoking question if they felt they could get away with it? I don't remember what the value was now, but we took that number and cut it in half to see what the sensitivity was, and it turns out that in that specific case the ROI values dropped 5%. Now 5% may not seem like a large number in aggregate, but had we looked at the smoking question in and of itself, you would have seen a much different change. As far as HIV goes, what happens if the prevalence is 50% higher than what we've assumed? In that case the ROIs actually jumped almost 10 full points in the aggregate. So if we look at the summary of these few sensitivities that we ran, we can see that as far as mortality goes, there was some ROI sensitivity to the choice of the basic table used and the level of future deterioration or improvement factors that you might choose to employ. Regarding lapse rates, there's a definite ROI sensitivity to lapses particularly at the older ages. As far as the smoker honesty question, there's some ROI sensitivity in the aggregate, not too much, but again you can't be misled because, if you looked only at the smoking question in and of itself, you would have found a lot larger values, a lot

larger differences. As far as HIV goes, there's some definite ROI sensitivities, especially at the younger ages.

So far we've dealt pretty much with the theoretical considerations of changing testing limits, but for each individual company, there's a number of practical issues that really do need to be explored prior to making the decision to change or even to look into changing your testing limits, and I hope to show you some of the more pragmatic considerations that you might want to consider. For example, I came up with at least two different negative effects, and I'm using ROI as my measure here. For example, one effect is additional underwriting costs if a company has to incur an increase in staff to handle an increased load of laboratory tests. If that's the case, you would definitely need to recompute your expected ROIs based upon the increased expense of adding staff. Another negative effect on the company would be a potential loss of market share due to unhappy agents or customers because of the lower testing limits imposed by the company. Now this specific example doesn't have a direct effect on the individual ROI calculations, but it does affect, of course, the company's bottom line profitability, not so much because of the dollar losses, but because of less profit due to reduced sales. So remember these two issues, additional underwriting cost and lost market share.

Let's look at the positive side of things. There are a number of counterbalancing effects which work both to increase the ROI and provide other benefits to the company to enhance its profitability and image. For example, if the premiums remain unchanged, there would be an increase in profits on new policies written at least between the old and the new testing limits. On the other hand, if you reduced premiums, you could thereby share with the new policyholders the increased benefits of the testing while becoming more competitive in the marketplace at least in those areas between the old and the new testing limits. Number three, there's a possibility of a larger quantity discount from your labs. Of course, you'll need to discuss that with your specific laboratories, but these discounts could certainly help offset any increased staff you may need to add. Looking at it from a reinsurance perspective, you might get a better quote both on your coinsurance allowances as well as your YRT rates because the reinsurer may view your company as having a better hold on mortality.

Is that possible? I think it is, and I think Paul went through a few things which make me believe that underwriting costs can certainly be contained, unit costs can go down, and there actually might be a real benefit, for example, if you did not have to increase staff. If you're already not at capacity, there would be no additional cost. How about less claims hassle? Well, I included this thinking there might be less of a claims hassle during the incontestable period at least, if you had a better documentation of what the results were when you made your underwriting decisions based upon those things. One item which is not included pertains more to mutual companies; to the extent that premiums are not reduced, dividends could theoretically at least be increased for that group of policyholders subject to the new lower testing limits. Finally, this is hard to put in a financial sense, but I think there's a real feeling of pride because the company and its staff are producing quality products for both agents and customers at competitive prices. I think this helps improve a company's competitive image in the marketplace, and ultimately will help improve agent retention and recruitment ratios.

So there it is, the protective value of laboratory testing. It exists, you can define it, you can measure it, and I truly believe it is cost effective.

MR. SADLER: Paul, I have a couple of questions for you. One, can you give us an idea of how long it took from beginning to end? By end I mean by the time you actually implemented the system on underwriting real cases. And second, how have your underwriters reacted? Are they threatened at all that a continuation of this philosophy is going to actually threaten their jobs and career?

MR. HOWMAN: To explain that, first of all let me address how long it took, and in answering that, understand that as we started looking at this, we realized that we could be not only the first insurance company to be developing or implementing a fully integrated automatic expert system, but also in reality one of the first corporations in the United States to develop this type of technology to operate totally on its own. There were other expert systems out there, but they were not operating totally on their own. We wanted ours to, so we started our path with a very concentrated effort. We started the actual project in September 1986, and in April 1987 we delivered a true working expert system that had been fully integrated. At that time we put it into a model office to watch it, to make sure that it was doing what we actually wanted it to, and by August 1987 we had deployed it to our operation and were allowing it to approve cases totally on its own. Now that's a 7 to 7.5-month window during that operation. I don't want you to walk away thinking it was easy running and inexpensive. We had a lot of people putting in a lot of hours, and a major concerted effort, and everybody on the project was 100% full time. During the entire course of the system, I had a chief underwriter for two years report solely to me to do the knowledge acquisition up to the point of deployment of the system to continuing to develop the knowledge to get up to the 55%. That chief underwriter was never asked to pick up a file and work a file whether it would be a contest period or year-end closings.

How did our underwriters react to it? While we were developing the system, we spent just as much time selling this technology to the underwriters as we did developing this system. We realized it was critical that they had to feel comfortable with it, and buy in early. Additionally, we had a very unique timing in that we had tremendously more work than we could process. We were logging 40,000 hours a year in overtime by underwriters at the time we deployed this system. They saw it as their savior. There were underwriters then and still are today who are nervous about what their future may be. But some of those underwriters are the ones who most companies have always had around, too who you just need for pure paper pushing, and who may not be true professional underwriters. I think their futures are going to have to be looked at very carefully, and they're going to have to make their decisions as to what they want their careers to be. But up until this point, our staff is very pleased with it. In fact, just recently with the FAST module, we took a line hit that rippled through systems, which caused lots of errors so we had to shut FAST off for a while. Our phone rang off the hook by the underwriters saying they didn't want to underwrite all those cases manually anymore. They couldn't handle this. They wanted FAST turned back on. So that's the attitude, but you've got to be very careful and cautious about making sure the staff realizes the system is an assistant to them, and it's not going to replace them.

MR. PHILIP G. JOHNSON: I have a question for Paul. Correct me if I'm wrong, but I think your TOPS system is used by several other companies or has been purchased by them. The reason I say that is our company took a look at that system actually, and I'm just curious if you have any plans for sending the CLUES system out in the same kind of environment.

MR. HOWMAN: We have looked at marketing the CLUES system several times. The current attitude as of yesterday was we would not sell the CLUES system because we saw it as a definite competitive advantage and did not want to give up that competitive advantage. I will go on to say, however, that subject matter comes up at least once a month, and could be changed at any point in time. We do see that CLUES could be a tremendous revenue stream if we would market it. But the answer is no right now.

MR. BERGSTROM: Just to follow up with that. What would you say is the percentage of customizing that would need to be done for a specific company like Sun if it wanted to purchase the basic unit? Would it be 50%, 30% or 80%, zero?

MR. HOWMAN: No, it would be more than zero. To give an accurate answer, I guess you would first of all have to understand and realize the other company's underwriting philosophy. One of the things we did when we developed the system was to modularize things as much as we could, and put things in tables so that we could update and change things so all the underwriting requirements and what's acceptable and not acceptable would be easily changeable. If the company's application differs dramatically from ours with either a lot more questions or no questions, that could cause a lot of changes. If on the other hand, the company would develop an application which would look very similar to ours, not necessarily the questions in the same order but the same type of questions, then it wouldn't take much.

MR. PADDON: I can summarize our experience. Back in 1982, before the words "artificial intelligence" had been coined, we were looking for ways to get more cases out in a shorter period of time, which is everyone's basic objective. To accelerate more than half of our cases, at that time, without a need for a trained underwriter, we were able to input all application data at our sales offices, have it electronically transmitted to the home office overnight, the policy number automatically assigned, and many policies issued in a much shorter period of time. So we had many of these features already in place early on. A smaller company can do major pieces of this automating and still realize substantial cost savings and improvements in service. Even though you may not have all of the artificial intelligence features, you can still take major items like blood pressure, height or weight, and automatically classify them; flag unanswered questions as a signal to underwriters; or generate additional underwriting requirements; and so on. There are many ways to accomplish the basic objective to improve service, quality and issue time.

MR. NORMAN K. MARTIN: My question is for Paul. It is very impressive what you've done at MONY. If I heard you correctly, your machine can approve a case in 12 minutes, you can have the policy in the agent's hands within 24 hours after approval, and you do the approval without the application. Does the application ever become a part of the policy? Where do you assemble it?

MR. HOWMAN: Today we are doing a pilot project of allowing the policy to be assembled in the agency, but by saying that, basically it's just a matter of the agency putting in a copy of the application. We do all the policy printing and everything else in our home office. That's how we can have the policy back to them. Today we use express mail to get the applications into us after they have been submitted through the FAST system, and we always express policies back out to agencies. When we first designed the platform for all these systems, we were thinking we were going to have to print policies locally in the agencies to make them happy. Because of the turnaround time we're now able to get, that's become a cry of the past. We have the design to facilitate it in the future, but it definitely is no longer a demand or cry from our field force. The agents are getting policies as quickly as they want them. In fact, we've already had a couple of situations where we got the policies back to the agency before the people there were able to set up their records, and we're wondering where the application came from.

MR. SADLER: Question for Jack. Your committee's risk classification slide show has been presented now several times. What's been the reaction of legislative groups and others that have seen the show, and has your committee got anything else planned for us along these lines?

MR. PADDON: I think the reaction has been quite favorable overall. I do believe, however, that actuaries must make this message better known and more widespread. Those of you who have these concerns and connections can be very helpful to our committee's volunteer efforts on behalf of the Academy by getting in touch with Erich Parker at the Academy office. The slides are available to Academy members at a nominal cost. The script also does an excellent job of describing the rationale for risk classification for a lay person or regulator, or perhaps even someone who is initially skeptical. We're trying to educate the public, in a nonconfrontational way, about why a seemingly wrong, illegal process is vital to the well-being of insurance in the private sector. Successful efforts by the industry to have individual life and disability HIV testing permitted in all states have been helpful in increasing this public awareness. But a similar battle may have to be fought soon on other basic questions such as "age discrimination" -- why must we charge different rates at different ages for individual coverage when we don't for group insurance? So there's a lot to be done, and I encourage you all to use the resources of the Academy office in telling our side of the story.

MR. JOSEPH PAESANI: My question is for the entire panel. A growing concern of our marketing people recently is the perception, real or otherwise, that there's a stigma attached to telling people that they're substandard or a special risk, and what the marketing people have asked us to do or think about is change the nomenclature. They really don't have a gripe with the way we do our risk classification or with the resulting costs involved in that, but they've asked us to change the nomenclature so that now we would call Table A and Table B, standard; and what we now call standard, we would call nonsmoker; and what we now call nonsmoker, we would call preferred. We won't change anything else, just the nomenclature. That makes a better picture. It's something that the potential client feels better about hearing. I would just like to know from anybody who would like to comment what he thinks. For our company, naturally our

underwriters and our actuarial department feel that it more or less skirts the issue rather than really addresses it, but I'd appreciate any feedback you might have.

MR. HOWMAN: I would definitely support what you said in that it really skirts the issue. Pretty soon if you start doing that, then instead of standard being up to a Table 2, it becomes Table 4, Table 16, and then you'll be on to, what do you call uninsurables? I think instead it's part of getting back to basics. It has to go back to forming a partnership between underwriting and actuarial, and a partnership with our marketing people, and re-educating the agents on what we're doing and why we're doing it, that is, explaining to agents why a person was rated sometimes not by being able to tell the exact reasons, but by what the rating means life expectancy wise. One of the biggest problems with the field force having trouble with rated contracts is not getting the extra premium, or not placing it -- some of it's the nomenclature -- but it is people thinking, oh no, I'm going to die tomorrow. Well, if they knew a Table 2 only took one year off of a 55-year-old's life expectancy, it's a different scenario, and I think we have to educate our field force, and the agents will start being able to deliver more of those rated contracts. The more we can educate the agents, the more of those kinds of contracts they can deliver. If we can make them believe that Table 2 is right, they'll deliver it. We're just not doing our job in making them believe in what we're doing.