LIVING TO 100 SYMPOSIUM

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Session 1A: Distinguishing Health Status for Advanced Ages

Moderator: Craig M. Baldwin
Panelists: Faye S. Albert
Thomas Ashley
Robert Gleeson
Stephen K. Holland

CRAIG M. BALDWIN: We can get started now that we have a full contingent here. My name is Craig Baldwin, I'm vice president with Trans America Re-Insurance in Charlotte, North Carolina. Welcome to Session 1A: Distinguishing Health Status for Advanced Ages. Just a couple of procedural things, for those of you who need EA credit for this session, there are forms outside the door. What we're going to do is have each of the speakers do their presentation and then we'll have questions at the end. That way we can kind of keep things flowing.

Let me give you just a brief bio on each one of the speakers, this is in the order in which they will present. First up will be Dr. Bob Gleeson, he's vice president and medical director of Northwestern Mutual where he has worked for the past 27 years. Bob has served as chair of the UCLA medical issues and risk classification committee and medical section and has taught at the American Academy of Insurance Medicine, tri-annual course. Identification of healthy elderly is one of Dr. Bob's primary academic interests.

Second up will be Faye Albert. Faye is an FSA and a member of the Academy. Currently a life and health consultant for the insurance industry, Faye has managed a wide variety of actuarial functions for several life insurance companies and a property and casualty insurance company. The scope of her assignments has included new product development, financial reporting, experience analysis and recommendations to improve profitability. She's a recent coauthor of a paper with Jim Brooks and Jack Bragg on health expectancy, which will be presented here at the symposium later on. Faye has authored or coauthored several professional articles within the industry and served in several leadership roles for the SOA and the Academy, including being a member of the SOA Board of Governors from 2001 to 2003.

Third up will be Dr. Tom Ashley, he is vice president and chief medical director of Gen Re Life Health in Stanford, Connecticut. Dr. Ashley studies biochemical sciences as an

under graduate at Harvard and is board certified in internal medicine, geriatric medicine and insurance medicine. Dr. Ashley joined Gen Re in 2000 and his insurance experience spans 17 years.

Fourth up will be Dr. Steve Holland. Dr. Holland is Long-Term Care Group's senior vice president and medical director responsible for design and development of the company's long-term care underwriting criteria and protocols, benefit to termination standards and claims and care management criteria and technology. Dr. Holland has been medical director of the Long-Term Care Group since its inception in 1990 and he is the lead author of the Long-Term Care Group's guide to long-term care underwriting, which is recognized and accepted as an industry standard by leading long-term care insurance insurers and re-insurers throughout the world. Without further ado, I would like to introduce Dr. Gleeson.

DR. ROBERT GLEESON: Good afternoon everyone. I'm delighted to be here for my third time talking to this group because I think you're focused on and paying attention to an incredibly important demographic challenge that we are facing around the world. As we struggle medically to understand aging and as you struggle, from an actuarial point to understand what the impact will be and how people can live their lives and use their money to best make use of this time, its important that we understand everybody, what's going to happen to this aging population that we all hope to be a member of.

I'm going to talk about healthy elderly and I'm going to talk about three problems and give one answer, all in about 15 minutes so we can get through 4 speakers and questions. Problem number one is that until recently, the healthy elderly were too rare, too uncommon to study. Now take a look at these population pyramid graphs that you've all seen before. I've colored the top two rows which are ages 80 to 84 and 85 plus. Now we're going to start and we're going to do every decade from 1950, I was 2 years old then, some of you were not born until the year 2020 and just watch what happens to the top two bars, because that's really what this conference and this meeting today focuses on; 1960, 1970, 1980, 1990. Now some of this is the baby boom bubble aging but some of this is that the health of the elderly is improving faster than anywhere else right now. The year 2000, we're not done, 2010, 2020.

Those are big changes, this is in 50 years, correction 70 years. Look at them again, just watch them, watch them grow. They're going to continue to grow like that until the year 2050. Our problem is that when we started studying the aging process, we almost didn't have enough elderly and now all of the sudden, we're going to have too many.

Problem number two is that our understanding of who is a healthy elderly person has changed with time. I can think of no better way to do this than to show you three people. Whistler's mother was 65 years old in the year 1870 when that painting was done. Raquel Welch was 65 years old in the year 2005. I think there's a difference, I'm not sure but you know I think so. Jack Lalanne was 90 years old in 2005 and we can laugh at him for selling his "Juice-O-Matic" machine and promoting two hours of exercise a day, but

he has to be an incredibly sexy 90 year old.

Problem number three, are we doing okay so far? Problem number three, we have a very difficult time differentiating the aging process from diseases of old age. Think about that. More diseases happen as we age, but the diseases are different than the fact that we got older. Got it? You have to think about that, because it is entirely possible to be a very healthy 80 year old. My 90 year old mother, I talked about her last time I was at this conference, is still driving, she will come to Florida in a couple weeks and rent a car, and she thinks nothing of it. If you told me 30 years ago that a 90 year old could rent a care and drive, well I wouldn't have believed it. Yet that's what's going to happen, that's different than being diseased in old age.

Aging is a process that begins early in adult life, sometime after the age of reproduction and caring for the young, probably about 30 I'm sorry to say and after that becomes a steady but not uniform decline in the functional capacity of your many physiological systems, so my cardiovascular system or my pulmonary, or my immunological or my hematological, all those are systems. All of those are changing with time. That change over time is what I think of as the aging process, it’s different than disease process. But the aging process itself leads to death when the weakest link in the physiologic chain fails. That's when you get the disease that's going to kill you or that you will die from. If my weakest link in my chain is the production of a chemical in my basal ganglia that's associated with Parkinson’s disease, if that's my weakest link and I don't know if it is, then I will get Parkinson’s disease and that will be my weak link that eventually leads to my death in old age.

One of the things we try to do with biomarkers and you hear that word a lot in this business, is we try to study this process of both aging and disease, but biomarkers are nothing more than every kind of test you can have of function, health or disease, so a blood count is a biomarker. What we’d like to find is a biomarker of aging, something that we can follow over time, starting at age 30 that shows a steady decline that applies to you and me and you, because then we can study aging and the process of aging to see what's going to happen and we can begin to intervene to change things.

The biomarkers today measure primarily disease and to some extent a little bit of good health. Cholesterol and HDL are biomarkers of disease, they're also biomarkers of good health. A coronary angiogram is a biomarker, pulmonary function tests, no you don't have that slide, are biomarkers, but they primarily focus on the population age 35 to 75 because over the last 30 or 40 years of developing medicine and tests, that's the age group we had to work in, that's the group we paid attention to, that's how we prevented heart disease.

The biomarkers of tomorrow will identify the aging process and the weak links that lead to death in the population that's mainly over age 75. That's really what we talk about when we talked about biomarkers of aging. Unfortunately, the biomarkers of aging, as you're going to hear in a few minutes, are relatively few. They become biomarkers of

disease and that's different than a biomarker of the aging process or of health. These are the kind of biomarkers and we're not going to go through them but you have not heard of them, P16, INK, 4A, telemers you may have heard of on chromosomes, interleukin 6. These are the new biomarkers that are being studied. Some day one of these or one of these could become as powerful or as important in medicine in our understanding of aging, as cholesterol was in our understanding of heart disease, but we're not there yet.

What are we left with that we can look at in old age, because sometimes in old age, what we think of as cholesterol, is he turning down the heat, good, thank you. Sometimes in old age, biomarkers change their normal range. When you're 50, as a doctor I want you all to have the lowest possible cholesterol because that reduces your risk of a heart attack. When you're 80, just look at the little orange part on the bottom, that's the risk ratio of a very low cholesterol, it starts to go up. We don't know why, we can hypothesize, but sometimes in the elderly, a very low cholesterol is a very bad sign, so some of the markers we've used in middle age don't work so well when we're elderly. They also don't work because we cannot measure all of the systems or the rate of decline as we age.

What are we left with? We have to identify a healthy 80 year old. Who is this person? The most consistent predictors of being a healthy 80 year old are, this is from a 1998 study, low blood pressure, low serum glucose, not smoking cigarettes and not being obese in middle age. The best markers of a healthy 80 year old are being a healthy 50 or 60 year old. That's about the best we can say today.

A healthy 80 year old, if we were to measure them, has supple arteries, with good lining, i.e. no heart disease, a blood pressure below 130/80, a total cholesterol to HDL ratio of less than 4/1, low insulin levels, does not have the metabolic syndrome, good physical strength, very important to the elderly, and probably a longevity enabling disease preventing gene. Anybody here last time when Tom Pearls talked about his longevity enabling disease preventing gene that he finds in the centenarians? It’s a very strong gene, we don't yet understand it but it’s probably real.

If you want to be a healthy 80 year old, you have to be a healthy 40, 50 and 60 year old. You have to not smoke, you have to eat well, exercise daily and be socially and intellectually active, this group is certainly socially and intellectually active. Anybody go for their walk this morning? You have to control your blood pressure and lipids, you have to have healthy relatives, and you have to stay strong, because those are the things that will make you the healthiest possible 80 year old. We have no better way to measure the health of an 80 year old today, we're looking for those, than to ask about the health when you're 50 and 60, so thank you. The next speaker is Faye.

FAYE ALBERT: Hello can you hear me in back, okay good. I'm going to talk about health from a slightly different angle than these other people on the panel because I'm not a doctor, I'm just an actuary and I'm going to review with you the work that we have had done in connection with developing a paper on health expectancy. This work started from the work that was done on mortality, which is the basis for a lot of places that

actuaries start and I did this work with Jim Brooks whose here in the audience and Jack Bragg who really is the father of the approach and started collecting the data on mortality and developed the idea of health expectancy and we just helped with it, I would say.

Anyhow, so this is an approach to evaluating health using health expectancy. Now what we had found and what is I guess everybody will kind of agree is that we generally start with mortality based on standard mortality, people that don't have any impairments and mortality levels for people that do have things wrong with them, our ratios to the standard mortality, so that if you have heart disease, your mortality, your probability of dying will be higher than somebody who doesn't have that. We have medical impairments that are related to mortality levels that are the basis for calculation of health expectancy and these mortality ratios are used in determining health expectancies.

The quantitative studies that we started with to get to mortality ratios were the ones that were put together by the Medical Information Bureau back in the 1970's. I don't know probably the actuaries here are familiar with that, other people perhaps aren't quite as familiar but in the 1970's, the Medical Information Bureau reviewed with doctors from the life insurance industry, the life underwriters, director life doctor underwriters I guess is what they were called and the Underwriters Association, as well as the Society of Actuaries, there was a liaison committee working in conjunction with them to try and evaluate the affect of various impairments on mortality. This basic study has been updated through the years with additional information.

Health expectancy is a way to look at the affect of medical impairments on mortality, then calculating the expected life mortality, the expected life of these people based on mortality probabilities at each age. These are derived from the standard mortality and modified for the affect of the particular impairments. Finally the last piece is that after you have the expected life of a person, then you divide that into healthy life, and residually unhealthy life.

The definition of what is healthy and what is unhealthy was related to the definitions that have been used for long-term care policies. That seemed to be the most quantitative approach we could use.

This is sort of key in developing health expectancy is that the mortality ratios that we derived, as I mentioned data was based on 1970 information and related back to the 65 to 70 basic table. The thesis that we used is that the relationship between healthy and unhealthy status for a particular life has the same ratio to mortality as it had at the time. This is related to the idea that your vitality is a certain level and the relationship of something affecting that vitality in a particular impairment is going to be the same in the future, so that the ratios that we apply today, used with the current table will be the same as the ratios that we had from earlier data.

For example, taking a sort of common impairment, diabetes, if we are looking at the excess mortality for a male who is age 48 in the original study, the mortality ratio for

somebody with diabetes at age 48 was 2.53 and applying that to the basic table that was applicable at the time, 7.13 results in an excess mortality of 10.91. The basic mortality is 1 and so the excess is 1.53. Today, using the 2002 mortality, for somebody who is age 48, instead of being 7.13, its 2.60, so the excess mortality then is 1.53 times that or 3.98.

The mortality ratio for a particular impairment, now in order to do health expectancy, we can't use just a single age, we have to have the range of ages going across the entire spectrum of ages and the way we developed our table was that the standard mortality, the relationship between the standard mortality to the impaired mortality decreases, so that as you get older and older, the relative rate of the impairment to standard mortality is decreasing.

The mortality ratios themselves, the characteristics of them is that we have used data for mature survivors. These ratios vary by cause and severity within cause and as I had explained earlier, the mortality ratio is determined at the central observed age for the observation period and the mortality ratios for other obtained ages are a function of the mortality at the observed age.

For multiple impairments, there's sort of groups of impairments so if you have something wrong with your heart, there's a whole bunch of different kinds of impairments that might be related to that, arthritis includes other bone and joint disorders, so they're sort of grouped together. Independent ones, for example if you have heart and arthritis problems, you would add them up but generally we use a grouping for what your most serious impairment is for determining your mortality ratio at your current age.

Health expectancy now gives us this nice statistic to deal with, to talk to people about. People have their expected future life, based on their own personal health status, they have the expected length of their life that will be healthy and their expected length of their life that will not be healthy. Of course as was pointed out before, this is based on our past experience. If we have the kind of cliff effect that was described this morning, this won't hold, but this is the current status of our information and data.

You can use health expectancy to plan for unhealthy periods, how long do you need, so if you're asking the question...another one of the questions that was asked this morning is how much money do you need to take care of your health bills, this might help you with that. It might help tell how much healthier your life will be or how much longer you might life in a healthy state if you change your lifestyle.

Health expectancy is a different approach for evaluating a person’s longevity and their health, their vitality and I'm not sure exactly how underwriters might use this but it might be an adjunct to what they are using in the other evaluation methods that my doctor colleagues have described and are going to discuss. Thank you very much.

DR. THOMAS ASHLEY: Thank you for that reminder that this is not a wireless microphone, but I probably won't remember long enough to make use of that fact. I'm

going to start the case western reserves segment of the program. I met Steve Holland when I was a third year medical student and Steve was a fourth year medical student and I'm going to tell this story just in case he was going to tell it, so I'll get their first. In the third year medical school, you learn how to be a doctor and among other things, that means you learn how to conduct a physical examination. Stephen was my instructor, so two of my classmates and I met with Stephen every couple of weeks and we learned how to do physical exams on whatever patients he was taking care of at the time.

Both Stephen and I have left clinical medicine, stopped examining patients and turned to insurance but I want to assure you that that teaching session had nothing to do with that decision.

I'm going to turn the program toward something that is more concrete in the way of what is happening in underwriting shops in the U.S. life insurance industry and I want to start with a little reminder of why this elderly market is so important to us. These are statistics from my company, looking at the age distribution of our inforce block of business and at the end of 2006, about four percent of our total inforce was over age 70. Looking at individual companies and individual products, we didn't find any that had more than 12 percent age above 70 at the time of issue, but in 2006, we had some clients on some products, particularly the UL's with the secondary guarantee which we think are the prime targets for the IOLI/STOLI business, the highest we saw was 70 percent of what was seeded to us by face amount was over age 70 for one company and one product.

This should be familiar to many of you, more familiar than it is to me but I want to emphasize why that shift in age distribution is so important to us. This is a hypothetical distribution. Ed Huey, one of our actuaries drew this up for me and let me use it. In this example, 15 percent of the issued face amount is above age 70. If you look at the present value of claims for that block of business, what you find is that more than 50 percent of the present value of claims comes from that 15 percent of the inforce over age 70. Every policy we sell in this age group has a disproportionate impact on the bottom line.

I want to talk about cognitive function. At this point, I'm going to take a huge leap that you'll have to suffer with me because of the time constraints. I want you to take my word for a couple of assertions. Number one that cognitive function is a very important determinant of mortality in this age group. Number two, cognitive dysfunction is very common in this age group and number three, our traditional mechanisms for underwriting the application, the physical exam, the laboratory tests, even the attending physician's statement, all of those things do an abominable job of identifying cognitive dysfunction in this age group, so we are pretty blind with our traditional underwriting to an important mortality determinant. This is true in spite of many problems with cognitive function.

Cognitive function isn't just one thing, the biologists refer to it as domains of cognitive function, language, memory, spacial perception, all of these things are separate cognitive functions, they involve distinct parts of the brain, they involve distinct diseases that lead to cognitive dysfunction. We won't ever have any test that allows us conveniently to

measure everything and we don't even have air tight criteria that help us distinguish normal from abnormal, but no matter how we measure it, we have problems with cognitive dysfunction that matter to mortality and there are ways of approximating this, even though it won't be perfect.

This is a little indication of what is beginning to happen in the industry. It was about four years ago that Gen Re developed a program to advocate functional assessment in elderly applicants. At that time, people were really not interested in doing this, it was dismissed as unnecessary and impractical but by the end of 2007, about 30 percent of our clients are already conducting some form of cognitive testing and a similar number were in a planning and evaluation stage. That has increased from what the SOA older age underwriting practices survey reported at the annual meeting last year.

FROM THE FLOOR: This is age 70 plus?

DR. THOMAS ASHLEY: Seventy plus is what I have used here as a definition of elderly. The survey responses were collected in August of 2006. At that time, about 20 percent were using some form of cognitive test and 20 percent more were planning to use it, so there is a big change. I think that a lot of companies are not doing this particularly well, we could be doing it better and I want to talk to you now specifically about options for cognitive testing and how to consider them.

What I want to do is review some options for cognitive testing and looking at these parameters. If we wanted to pick an ideal test for using in underwriting, no matter what we're looking for, we would want it to be very cheap, which means it has to be quick, and there shouldn’t be any fee for using it, other than the time involved. It should be clear to everybody involved, the protocol should be familiar to clinicians, easy to teach to para-med examiners. We want it to be scored in a clear way, which means that it should be quantitative and measuring some objective finding and then it should be valid. We want to pick something that has a clear relationship to the outcome that matters to us, which is mortality in this case. Mostly that's going to have to come from clinical literature.

The tests that I think are the chief contenders are the mini mental state examination, the clock drawing test, the Minnesota cognitive acuity screen, the enhanced mental skills test and the delayed word recall. I gave you a protocol for the mini mental state examination, it’s at the end of my section of the handout, because I think it is useful for you to take a look, in real concrete terms, at the raw material that goes into underwriting.

The MMSE is certainly the widest used clinical test, it’s often used as a benchmark to measure the performance of other cognitive test alternatives. Its very simple, its quantitative and transparent and it has the advantage of testing several different cognitive domains, but if you look at what's actually in this test, it’s a 30 point numerical score but 10 of the points come from asking orientation questions, by which we ask the applicant what year is it, what season is it, what's the date, what's the day, what's the month, where are we, so that's a third of the test.

Then we have several other elements of the test. One of the interesting things about the mini mental state examination is that the last question asks applicants to copy a pair of overlapping pentagons. It's a simple test to perform. One of the problems is how do you teach underwriters to evaluate this test, so if you draw your pair of overlapping pentagons, how can you define whether or not you score a point for that. You can develop rules for doing this, it's not simply a matter of judgment. The rules are that both figures should have five straight sides and they have to be closed and the overlap should be a closed quadrilateral, but you'd have to teach underwriters to look for those things in order to judge that consistently.

Another problem that I think the mini mental state examination presents is that it's a simple cumulative score, every point counts the same. The pentagon counts one point, being able to spell each letter of the world backward counts one point and whether you know what city you're in counts one point. That raises some questions because when you look at the way you score this test, there are various measures but a 28 is considered a passing score, no matter what your age or education and it wouldn't matter whether you thought it was 1965 and scored a 29, that would still be a passing test, a very high level of performance. I don't think that all of these points by any means represent equal levels of dysfunction but that's how we have to measure this test.

It's well known, from the literature, that this test is sensitive to your level of education and your age, so you would need to use separate norms at different age groups and different levels of education if you want to use this in underwriting. Finally, there is a copyright on this test that's not vigorously enforced but there could be a fee for using it.

The very strongest point of this test is that it has more mortality validation outcome than anything else we could possibly look at. What this slide shows is that if you're in that high normal range and with every decrement in you MMSE score the survival decreases.

I think the MMSE does very well for cost and clarity. Scoring is a problem because of the equal weighting and because of the difficulties of dealing with an image and the mortality is good. It's not a very sensitive test; it doesn't pick up mild disease very well.

The next test I want to talk about is the clock drawing test, a very popular test that's being used and I gave you one example of the clock drawing tests, that's another page of the handout here. This test also involves several different cognitive domains and it is particularly strong at looking at what we call executive function, which is involved in intact memory and being able to plan a task.

The test is interesting. This handout actually isn't ideal because there's writing on the other side but what you do is you give this piece of paper to the applicant face down and you get very simple instructions. Draw me a clock that says 1:45, set the hands and numbers on the face so that a child could read them and then somebody draws the clock. There are some interesting parameters to the test, for example, one of the things that goes

wrong with some kinds of cognitive dysfunction is a phenomenon that we call intrusion, which means that you're paying attention to extraneous things that divert your attention and the focus of your activity that are irrelevant to the test.

If you look at the way that we score this test on the front side of the paper, if you, you may be able to see through this, if you use the circle that shows through from the wrong side of the paper, you lose a point because that's an intrusion, you shouldn't be paying attention to something that's on the wrong side of the paper. Another factor here is you should, to get full credit, you should put the 12, 3, 6 and 9 on the clock face first, because if you are a good planner, you're more likely to produce and evenly distributed array of the numbers. I feel that point, I still can't remember to put those numbers on first but that's one of the ways in the scoring protocol that you lose a point. There are a variety of other factors in measuring this.

Executive impairment is often an early change in many different changes. It might precede memory loss in Alzheimer's dementia but it is not as common as memory impairment itself. Here's an example of a clock drawing test that I actually got from one of my colleagues at Thriven in Wisconsin. If that test comes in to the underwriting department, I think no one will have any trouble calling it a rather abnormal test. However, my colleague who was doing this actually gave up the clock drawing test because there were too many times that they couldn't agree on whether a test passed or not, there were too many difficult calls.

I saw one from another client that had passed several senior underwriters, one of the medical directors but I had a real question about the performance of this clock and one of the problems was that it came down to whether the two digit number at the top of the clock was that a 10 or a 12. It wasn't clear how to decipher the handwriting on these tests. Dealing with images is difficult and even with a rigorous scoring protocol, such as the clocks protocol, it can be very difficult to classify these tests as normal or not normal.

One little interesting tidbit about intrusions, the instructions on this test were deliberately designed to elicit intrusion, so when we say set the hands and numbers on the face so that a child could read them, some people with more significant impairments will actually draw a hand or draw a face because they're paying attention to the instructions and not the abstract purpose of the test. When you have the numbers 1:45 in the instructions, some people will point the hands at the 4 and 5 as an example of an intrusion. The clock drawing test has a lot of strengths and it’s very interesting to work with, there is a fair amount of mortality evidence behind interpreting this test, but I don't think that it does quite as well as some of the alternatives, in terms of a test that is practical to use in the underwriting department.

I'm going to skip very quickly through two proprietary tests, the enhanced mental skills test uses memory recall from a word list. It’s sold by Life Plans affiliated with Munich Re. One of the interesting factors in this test is that there is, so far as I know, exactly one research paper that supports the use of this test. It shows that the EMST has, in this one

report, a superior sensitivity and slightly worse specificity than an alternative for differentiating mild cognitive impairment versus normal people, but that's the extent of the support for this test. It's very hard to validate this and if you try to use this with clinicians who are trying to deal with your applicants, it will be hard to communicate it.

Another factor of this test is that anyone can administer it, in fact, the sponsors say you can even administer it over the telephone, it doesn't have to be face to face and I don't know how you would do that on the phone, it would obviously save money but I don't know how you would know whether you were testing your applicant versus the agent or the family members who were there in the room.

The EMST obviously has some cost associated with using it. It's not as clear in terms of communicating it. The scoring is quantitative, you will get a number but you won't know how that EMST sponsors derived that number, they'll just tell you here's the number and here are the ranges that are associated with it and there's no mortality information on it.

Then the Minnesota cognitive acuity screen is, in many ways, similar to this. It's a proprietary scoring algorithm, on this test you have to hire the nation's care link to administer the test, as well as to score it.

Lastly, I want to spend a little time talking about the test that when I was reviewing the options, I decided this was really the way to go and that's the 10 word delayed word recall. There's a lot of experience with this test, even in the insurance industry because long-term care writers have used it for many years. It measures a couple of different domains of cognitive function, particularly memory, which is typically the earliest deficit when you have dementia of the Alzheimer's type.

The way you do this test is you have these flash cards that have the 10 words and you go 1 by 1 through the flash cards and you ask the applicant to read the word, use the word in a sentence and then you go through each of the 10 words and repeat this. You go through each word twice. The importance of that is to help get a better separation between normal people and impaired people. If you have normal cognitive function, you have this reinforcement process that you make sure you're paying attention, you look at the word, you used it in a sentence, you repeat it. If you're normal, that will raise your score, compared to just looking at the list of words and then trying to remember them.

If you have Alzheimer's disease, your score isn't going to go up from that exercise, so you get a cleaner separation of the results. There is a published protocol for this test, which I think is important to follow. Scoring it is as simple as it can possibly be, you get an integer from zero to 10, based on how many of these words you can remember, after waiting exactly five minutes from presentation of the last word until asking people to recite as many as they can recall.

There won't be any problem whatsoever, there won't be any arguments in the underwriting department over whether it's a four or not and you can write clear

guidelines for your underwriters so that everybody will know what to do with a four.

I think the DWR really does a better job to me than any of the alternatives of hitting the markers for clarity, cost, scoring and mortality. Part of the mortality evidence comes from work that we have done in cooperation with a long-term care underwriting administrator. We have been able to track a population of applicants with their DWR scores, use social security death master file to ascertain survival and we also had information on the underwriting as to whether the applicants were declined for cognitive reasons only, declined for other reasons besides cognitive, so we constructed what we considered a reasonable surrogate life insurance population, looking at people who were accepted for long-term care or declined for cognitive reasons only, those people likely to sneak through, if we're not looking specifically for cognitive dysfunction.

We're going to publish an update on that paper that will be in the Journal of Insurance Medicine some time later this year, and as an example, what we found is that people with a DWR score of 2 had a mortality ratio of over 205 percent of the 2001 BBT, whereas people with a DWR score of eight had a mortality of just a little over 100 percent. We also then were able to do some cost benefit analysis, and to skip through all the details to save a little time, we estimated how much you could afford to pay for a test, if you excluded people who scored less than four on your DWR and didn’t pay those claims, because the prevalence of cognitive dysfunction goes up rapidly with age, so does that break even point, but to pay for $500,000.00 policies, you could pay $6,000.00 a test, even at age 70 and that rises to $65,000.00 per test at ages 90 plus.

Its obviously not an ideal study in terms of being a true life insurance applicant, a true life insurance process, its not the same market or the same people but even if we're wrong by an order of magnitude or more, this is a very effective thing to do.

I'll close with some recommendations about underwriting, which are that I think we definitely need to be assessing cognitive function, many companies are doing that. I think the best test is the 10 word delayed word recall. The clock drawing test is a reasonable, I would consider it more a supplement than an alternative. The way I look at this is there's a lot of overlap in any of the tests that we might do and I think it’s interesting that after years of companies resisting doing any of this, some of them are now jumping in doing multiple cognitive tests, such as both a 10 word DWR and a clock drawing test. I think that we would get this much benefit from doing the DWR and if you add the clock drawing test, you might get this much more but there's certainly going to be some diminishing returns and some increased cost.

When your underwriting department thinks about what test to use, it’s important to use something that has some validation. I see companies using a three word delayed word recall, which is a piece of that MMSE examination. Well if you're not using a complete instrument that has some clinical validation, if you're just picking and choosing pieces of something, I don't think you know what you have as a result and you won't know how to interpret the scores or to put any mortality projections around it.

I think it should be a quantitative test, we really don't need to make underwriting any more confusing by having people wonder about the drawing of a clock or other pieces of this that are subjective, so we want it to be quantitative and objective like the DWR. The important thing to me about underwriting is that we should make sure that when we make a decision about an applicant, two different applicants who get two different decisions, it should be about differences between the applicants' not about differences among the underwriters and if you make this quantitative and objective, you'll get there. You should all converge on some sort of common standard. Companies want to cook up their own tests, but that's going to require a longer period of training for your para-med force, a longer period of training for your underwriting staff and it will wreck any possibility of doing inter company studies. If we are all doing a 10 word DWR, it would be fairly easy to aggregate the results of that test, produce more reliable, more credible mortality studies much sooner than and of the companies will be able to do on their own.

Then my final point is that you don't want to be the last company to test cognitive function because you'll find yourselves insuring an awful lot of people with Alzheimer's disease. I'll stop at that point. Dr. Holland is up.

DR. STEPHEN HOLLAND: We'll move from talking about instruments, Raquel Welch and others and move into something very practical and what I'd like to do over the next few minutes is really look at long-term care underwriting, look at our experience in the oldest of old ages.

For a few minutes, I'm going to talk about some age based underwriting issues, some of the typical underwriting protocols in the industry, our experience underwriting those 80 years of age and older, looking at some of the claims experience. We started our underwriting on the cohort that I'm going to be talking about in 1995, so we've got about 12 years of data and then I'm going to tell you about the mistakes we made and how we shifted our underwriting protocols and our underwriting emphasis and our philosophy and then tell you about the lessons that we learned. We learn from our mistakes.

In long-term care underwriting, our goal of course, is to produce some sort of an underwriting effect, so five years, seven years, I know actuaries out there, how many people out here have priced long-term care products? You probably all are hoping for a 10 year plus underwriting effect, I hear some people say it never goes away. Of course, we've only been doing this for 20 years so who knows, but you start with a community pool and then we have to improve that. We obviously have to look for adverse selection, we've got to identify high risk applicants, those that are currently disabled. Obviously we can't insure those. We have to look for people with a high probability of an early disability, those individuals who have a high likelihood of an early death, because obviously there are costs involved, many products don't begin recovering their costs for a year and a half, 18 months, sometimes two years, if you look at commissions and costs of issuing a policy.

Then more importantly we have to look for those individuals who have predicable high lifetime risks of disability and dependency. At the same time, we have to maximize acceptance rates. It's easy to decline someone, but there are people out there selling these products and they need to place these products and if you're declining two out of every three individuals, this product is going to go away, because people have to be able to sell it.

Our goal is to produce some sort of an underwriting effect. Unfortunately, we don't have mortality tables, we don't have the data that many of you have in life insurance and disability. Let's look at the challenges in the older ages. What you see is what you get; multiple medical conditions, the issues of current function and cognition are critical and then thinking about looking at you know when you see a certain disease, what is the functional trajectory of that disease over time. That becomes very critical. You also have to understand the inherent risks presented by individuals applying for long-term care that embody adverse selection, buying because of a new diagnosis. It's easy to sell long-term care insurance at a Parkinson's clinic. Family and spouses have special knowledge that perhaps the agent doesn't or perhaps the agent does or that you don't know as the underwriter and often buying because they need it or will soon need it.

We know that disability is common, you're going to hear a lot more the next couple of days about disability rates that are associated with age, but suffice it to say that disability is common, morbidity is common and it increases with age. If you look at the prevalence of Alzheimer's disease, its scary, as we do u underwrite people in these older age groups and so we have to have a way, as Tom said in life insurance, as well as long-term care insurance to, if you will, weed out these individuals that already have the earliest signs of disease or have the disease at the time of application.

Risk factors are common. Taking our data and looking at applicants just 65 years of age and older that have applied for both individual and group long-term care insurance spread throughout the country, about half of these individuals have arthritis, they either complain about it or they're treated for it. Twenty one percent of applicants are cancer survivors; fifty four percent of female applicants have osteoporosis, probably much more but much of it is undiagnosed and untreated. Diabetes and/or hypertension, about 16 percent of applicants over the age of 65, stroke, TIA, coronary artery disease, very prevalent over the age of 65 and interestingly enough about 4 percent of applicants either complain about memory loss in their medical records or they have documented dementia and are on Aricept or Nomenda or one of the other medications at the time they apply for long-term care insurance.

What about older applicants, those 80 years of age and older; 80 percent have some form of arthritis, diagnosed by the physician and/or treated by the physician. Forty two percent of those applicants are cancer survivors, osteoporosis now represents about ¾ of the women 80 years of age or older have a diagnosis and are treated, unfortunately, the other 25 percent there's probably no information about whether or not they have osteoporosis. Diabetes and hypertension now rise to about a third of applicants, stroke, TIA, coronary

artery disease, still major players, macular degeneration starts coming in as well.

Dementia or memory complaints, about a third of applicants over age 80 are either complaining to their doctors about memory problems or they actually have been tested and they have a diagnosis and are treated. There's a lot of morbidity in the oldest old and less than 40 percent continue to drive, you know a proxy for perhaps functional independence.

Let’s look at a typical applicant. This is the average applicant over 80, has 5.2 diagnoses, they're on 8.5 medications, Medicare part D, who priced that, they're retired, they're female, they live alone, they drive less than 50 miles per month and they have limited activity levels. This is the typical applicant, the average applicant that you see over age 80.

Its important to remember that age is of course related to morbidity, which is obviously related to premium and as age increases, premium rates increase, in fact, we're looking at probably about a six times the amount of annual premium for a ninety year old as a fifty year old, six or seven times, so in a sense, people that are buying at older ages, are spending a lot of money and that, in a sense, drives adverse selection because people that are going to spend a lot of money on something have to believe that they're going to use it. I'm going to show you a little bit of data about that in just a moment.

What is the typical underwriting protocols? First of all, we started this in 1994, the data that I'm going to show you in just a few minutes comes from a cohort, a group product that had no maximum age limit. We got applications from 85 year olds, 90 year olds, we actually underwrote and accepted a couple of people in excess of 100 years of age and in this business, we knew they were over 100 years of age, because there's every reason to try to lower your age because the premiums are cheaper, there's no benefit to overestimate your age in this, in long-term care insurance, because premium of course, is related to age, so we aggressively underwrote this.

In most group and individual products, you'll see some type of a long form application, medical records are very important and still relied on. We're starting to use prescription drug services now that rely on PBM’s, pharmacy management benefit companies. There's always a face to face assessment, along the lines that Tom mentioned, looking at functional status, there's some functional testing now, be it the get up and go test, hand grip strength, there is an assessment of independence, of lifestyle issues and cognitive abilities via some form of cognitive testing.

In long-term care insurance, for those of you that don't work in this business, usually many of these same techniques are used in younger applicants, however, most insurance companies move from a phone interview to a face to face interview at about age 70. Specialty physician records tend to be more frequent because most applicants have multiple physicians and neuropsychological testing is rare, usually through an appeal. Sort of like the cardiac cath or the stress test of life insurance you know where you ask

the applicant to get this to prove that their heart is normal, in long-term care insurance, when somebody fails a cognitive screening test, usually you will look at neuropsychological testing, which today is our gold standard for cognitive abilities.

Let's look at some data. Our database from which I pulled this has about 850,000 insured individuals. We have more than 12 years of exposure over 40 million months of exposure in this database and from this database I've culled about 200,000 insureds from plans that accepted all age ranges. A lot of insurers today cut off at age 80, age 79, several go to age 82, but this data set has individuals of all ages, up to and including several individuals greater than 100 years of age.

It's a tax qualified plan, strong ADL and cognitive benefit triggers, so everybody knows what that is, under HIPAA, two ADL dependencies, regular hands on assistance required, it doesn't mean you need it, it means you get it, or cognitive impairment, moderate to severe, requiring substantial supervision, which the IRS defines as continuous supervision. It's really a fairly severe form of disability, two ADL disabilities, with regular hands on assistance or moderate to severe cognitive impairment. This is not a cash product, but payment of incurred expenses, there's care management, the individual who goes into benefit has a care manager that they can work with to help them negotiate the care system, the custodial care system. These polices are comprehensive, that they provide nursing home, assisted living home care, independent providers, hospice care, respite and some home modification.

In this database, we have more than 85 percent of individuals were approved. As you can see, the average age, overall, is about 62, which is a little bit older. This is a group product, a little bit older than many of the commercial products out there, the individual products that are out there. Sixty two percent were female, sixty percent were married, twenty six percent lived alone, and of this smaller data set I had 19 million months of exposure to work with.

What's been our underwriting experience in those 80 years and older? We've had close to 9,000 individuals fully underwritten, our accept rate versus decline rate as you can see, reflects the fact that there's a tremendous amount of morbidity at older ages. In fact, we are only accepting 16 percent of those between 90 and 94 and only 6 percent age 95 and above. The declamations of course parallel that. We have issued 2,900 policies and that's produced an experience of over 234,000 exposure months or covered months if you will.

Let's look at some claims data. Overall this has been a very successful risk pool. You have about .48 paid claims per 1,000 months of exposure, we're paying about 82 percent of the maximum daily benefit, so people do conserve their benefits to some extent because many of these are pots of money or pools of money that will exhaust. There is lifetime coverage in this pool though. Today, we have paid over $400 million in total claims, it's been a very successful pool, I have to say there's been two small rate increases in its 12 years of existence, mostly because they missed the lapse rates, they

missed mortality rates and they missed investment income. Also this is a self insured program and so new administration wanted to boost the reserves to be more statutory, more like an insurance company, and so they have had two rate increases. However claims incidents and duration have been right on the marker below.

We've paid 7,200 claims, interestingly enough about 90 percent are always in payment, about 10 percent are in a deductible, this has got a standard 90 day deductible, the average paid claim is about $1,400.00 per month. You'd be amazed at how inexpensively disabled individuals can be maintained in the community. Many people are really, if you will, getting around the clock care with family and paid caregivers at about $1,500.00 a month, its pretty amazing.

Right now we're paying north of $7.6 million a month in monthly benefits, and interestingly enough this is not a nursing home product, this is a home care product or a community based product. Over 86 percent of individuals live in the community, whether that be in assisted living or home care. Only about 12.3 percent are in nursing homes, so really nursing homes, for these products is the last step and many individuals today are dying either at home or in assisted living.

Let’s look at the 80 year olds, remember we've got about .48 claims per 1,000 months of exposure. Right now we've had 1,100 claims for those that applied and were accepted at 80 years and older and again we aggressively underwrote these individuals. We really, in a sense, accepted senior Olympians. They had to go through many more hoops, we had much stronger criteria when it came to cardiovascular disease, pulmonary disease, arthritis for those than the under, so we looked at these individuals very carefully.

Today we've had 1,100 approved claims, which is about 14, 14 times the claims rate on a per 1,000 month exposure versus those, the entire cohort. Only about three percent have recovered during the elimination period and about 7.4 percent have died during the elimination period. The average duration of a closed claim is about 880 days and for an open claim its north of 1,200 days.

Let me look at all ages combined. These are the typical diseases that we see at time of claim, dementia, stroke and cancer are always the top three, no matter what database I look at, cancer is very prevalent; however, if you look at total dollars or dollars per claim, cancer drops way down to about 40 because of the tremendous compression of morbidity, but as you can see, overall for all claimants, dementia comes in at about 25 percent, stroke about 11 percent and then a number of additional diseases that were not picked up at underwriting or that have occurred since underwriting.

If you go to individuals 80 or older, cancer kind of falls away and some of the more injuries and fractures moves up dramatically, along with rheumatology and cardiomyopathy, falls and gaits abnormalities actually move up a bit too. They are slightly different, these individuals are slightly different when it comes to the type of diseases that cause claim, the precipitated claim and then to keep somebody in claim over

a long duration. Interestingly enough, of these 10 diagnoses, it accounts for almost 90 percent of paid claims.

What did we find? We actually found that despite our great underwriting, claim rates went up in the initial six years of this program. Claim rates were higher the older the individual was at the time of entrance into the risk pool and they were earlier, despite our underwriting. That kind of makes sense, older individuals you think would go in on average, earlier than younger individuals.

Longer, we thought there would be a compression of morbidity, but obviously our underwriting was doing something that we didn't understand. We were underwriting out mortality at the same time we were underwriting out morbidity and these people actually lived longer in claim. In this group, the older 80 to 85 ended up consuming a massive amount of the total benefits, you know more than 65 percent of total benefits being paid and they had higher benefits of trends or higher benefits.

This is really a loss ratio if you will, it's a simple doctor's loss ratio where you took the number of benefits paid per dollar of premium collected, as you can see in the older groups, at least the 95 plus, they were spending a lot more money than we were collecting for that group. From a compression or morbidity or recovery standpoint, we even had less older people dying during the elimination period and younger people were dying at a higher age, so we did a really horrible job, in the sense that we were getting people that were very healthy, bringing them in, they would fall and break their hip or dementia would occur and they had good lungs, good hearts, good kidneys and they seemed to live forever.

In fact, we never reached, in the first six years, reached the expected mortality used by the group, annuity mortality payables, we were always under that. Real quick now so what we recognized was that the margin between independence and dependence is very thin in the oldest old. Morbidity is intimately associated with mortality. If you do a good job underwriting out morbidity, you probably are going to do a good job of underwriting out mortality, at least in the early years of your program.

Individuals that are very old injure themselves, they become sick and they decondition rapidly and guess what, they don't get up and become functional and independent like individuals that are maybe in the 50's or 60's. Aggressive underwriting impacts are compression and morbidity, so we had to do a shift in underwriting. We accepted greater levels of cardiac and pulmonary morbidity, we refocused on stroke risk, because that was a major issue, we improved our cognitive screening, we went from one test to another one, we bought the company, we bought Nations Care Link and we're now using the Minnesota cognitive acuity score screen and we redoubled our efforts to identify those that are frail and who were in the midst of functional decline.

This is a little bit of data from a comparison of people under the old regime and the new regime and suffice it to say these are just trends, these are very low numbers but we are

experiencing a little bit lower claim rate per 1,000 under the new regiment, our new underwriting philosophy. The duration of claim is sort of moderating, it's coming down, compared to all claims, it's not way above so these people are dying a little bit quicker. It looks like at least over 12 years we're finally getting close to what our actuaries hoped for is getting a few lapses from death, at least some lapses from death with a ratio of one of actual over expected mortality.

What were our lessons learned? There's heightened LTC risk at older ages. Do I know how to underwrite a 90 year old for long-term care insurance? I can't really tell you that I do. It's difficult. Sometimes we feel like we're flipping coins or throwing darts. Higher premiums at older ages, obviously induces adverse selection, there were things that we just couldn't figure out or detect at time of underwriting that showed themselves up two or three years later that had probably been in existence before we underwrote the individual.

Morbidity is intimately associated with mortality. My fear is that we've been doing such great underwriting that we're going to lose the effect of mortality, we're going to end up with a bunch of 90 year olds in claim with dementia, with healthy hearts, healthy lungs and healthy lungs and they're going to live forever. The margin between independence and dependence is very thin as I mentioned before, claim rates are high, they occur early and they are long, which is counterintuitive for older ages. You would expect there would be some sort of very significant compression morbidity. At least in our early days, there wasn't—there seems to be more now and the shift in underwriting strategy we believe has impacted our claims duration in a very short period of time. Thank you.

CRAIG M. BALDWIN: We've got a few minutes for some questions for those of you who have some, please step to the microphone, identify yourself and your affiliation because this session is being recorded, so questions?

FROM THE FLOOR: Just a few general comments about terminology, much was said about biomarkers, from the point of view of bio-demographers, the biomarker has to be something you can apply rather easily to large numbers of people in the field so you have an overlapping but a simpler set of biomarkers, some including anthropometric measures, like waist hip ratio that are easy to take, blood pressure of course, with emphasis on the systolic but sometimes combinations of those, also through blood and urine samples, epinephrine, and neuroepinephrine so to measure kind of stress levels in the individual. With respect to the paper that Faye gave, there's an issue here of terminology again, as I understand it, when you're talking about healthy expectancy, you're talking about the variations in expectancy dependent on the cause of death, is that right, diabetes, rather than what the bio-demographer means by healthy demography or active life expectancy or UN means, or WHO, where they're combining a measure of health, like disability and life expectancy into a single measure out of tables active life permitting the separation of the healthy part of life expectancy and the remainder. Just let me go on, so with respect to the last paper, it was impressive to me that again I'm reminded that the different products, I'm a demographer, so I'm speaking as an outsider that you sell, you have

different interests in. If its long-term care, you hope they'll die quickly, if its life insurance, you hope they'll live forever, if its retirement, you hope they'll what die immediately. What a business.

PANELIST: Luckily what we hope has little to do with reality.

CRAIG M. BALDWIN: Doctor.

FROM THE FLOOR: Thank you all for wonderful presentations. I'm a little confused. If I heard what Steve said at the end that in his population that is aggressively underwritten, they are getting people who are living longer but they have dementia, they're probably having dementia so their claims are going up, yet they're being screened fairly actively for that, yet what I heard in the presentation before that, the first of the two case western presentations that people with dementia have an increased mortality risk. It seems to me that there's a disconnect there, am I missing something or I mean...

DR. STEPHEN HOLLAND: I think what I was saying is that I think in long-term care insurance, if we underwrite aggressively every bit of morbidity, we're going to end up maybe seven, ten years down the line, these people are going to be at older ages, they're going to all be in their 80's or 90's, which have higher prevalency rates of dementia and then it seems, and again my data is tenuous(?) here, but it seems that these people, the data is showing that they live longer than we had expected them to live, once they were in claim, so that their morbidity... But again remember these are underwritten. Tom was talking about mortality of individuals in his set that were both approved and declined and then they controlled for some diseases, I believe and so you know my data shows people that were underwritten and accepted and Tom's is a group of everybody that applied for insurance.

FROM THE FLOOR: Which raises the issue of does using the death record and making assumptions from that really give us the information that we need to know?

DR. THOMAS ASHLEY: There's a lot of clinical literature on the increased mortality issue for people with a diagnosis of dementia of any kind and I think what that says is that people with dementia have a higher mortality rate than people without dementia, that's not contradicted by the fact that people with dementia have claims that last longer than the pricing projections expected.

FROM THE FLOOR: I guess my question is and since I would argue that in the 70 plus year old applicant for life insurance that most of them are underwritten rather incredibly, you know they get records from everybody from having been on the direct side, we see more records from 70 year olds than you think they could afford to go to physicians, and yet we continually hear about the need for, and I'm not disagreeing with you Tom, I'm just saying we continually hear about the need for cognitive assessment and I truly wonder how much more than will add to overall improvement in mortality in this age group, in the underwritten group, its just a question I have.

DR. THOMAS ASHLEY: I think one of the clinical studies that informs that question is the cardiovascular health study, which involved taking independently living elderly people, they didn't require any assistance, they did very, very, very extensive health status evaluation and then followed them prospectively and then did multi-variate risk analyses to figure out what facts at the time of enrollment were the most predictive of mortality and did the mathematical tricks to figure out whether they were independent of other factors and top of the list was cognitive dysfunction. The most predictive independent risk factor for mortality was cognitive dysfunction.

CRAIG M. BALDWIN: Unfortunately, I think we're out of time but I want to thank you all for coming and thank our speakers also, thank you.