Introduction

Life expectancy estimates are used to determine the selling price of a life insurance policy being sold. In essence, an investor with a defined expected return will pay more for a policy if the life expectancy is shorter, and will pay less if the life expectancy is longer. Life expectancy underwriting must be accurate and consistent. If life mortality distribution estimates are too high, investors will overpay for policies and end up with lower returns than expected. Conversely, mortality distribution estimates that are too low will result in prices that are under the policies’ economic value and sellers will not receive fair value for their policies. Investors need to understand the methodologies used by life expectancy underwriters in order to evaluate the legitimacy of the life expectancies they use in their analysis.

Firms that specialize in the estimation of life expectancies generally provide their services to support policy evaluation when a life insurance policy is sold or transferred for a consideration, or when a business transaction requires a life expectancy estimate. Life insurers have developed internal actuarial departments to perform their own evaluation of life expectancy prior to issuing a new life insurance policy or an annuity contract.

Some financial advisors encourage their clients to get life expectancy evaluations for better retirement and estate planning. Knowing one’s life expectancy (“LE”) can foster wiser decisions that can affect enjoyment of life. Many financial decisions are directly influenced by one’s life expectancy, including estate planning, purchasing of life insurance, purchasing of annuities, selling a life insurance policy, obtaining new mortgages, and perhaps entering into a new “significant other” relationship. However, most people do not typically get a life expectancy evaluation, other than what their doctor may casually observe.

The purpose of this paper is to provide education and understanding of life expectancy evaluations, the history of this profession, trends and new developments.
Early Genus and Use of Mortality Tables

A “mortality table” is a statistical table showing the probability of death at each age. It is usually subdivided by gender and smoking status. A mortality table represents a large group of people covering a long period of time. Mortality tables are used in a wide variety of circumstances where it is important to know how long a person is approximately expected to live, given their unique circumstances.

The need to estimate a person’s life expectancy began with the Romans. They are presumed to have created mortality tables from extensive census and death data, and used those tables to determine the value of life estates. However, not much knowledge of mortality tables was recorded until 1693, when Dr. Halley, a British astronomer, published the first tables of any importance. Dr. Halley created the table from the registry of deaths in the city of Breslau in Silesia, from data taken over a period of five years. Before the middle of the eighteenth century, most mortality tables were formed from observations made in the city of London. The mortality was generally low. In 1746, M. De Parcieux published the “Essai sur les probabilities de las Duree de la Vie Humanie” which had several mortality tables constructed from lists of nominees in the French tontines and from death registers of different religious houses. The mortality rates were higher than Halley’s.

The first tables generally used for life insurance pricing in modern times were the North Hampton Tables, created by Dr. Richard Price in 1771. He formed the tables by counting only deaths, and without using census data. The tables were based on faulty construction and represented excessively high death rates. Thereafter, the actuarial science of creating mortality tables expanded to include data representing gender, smoking/non-smoking, race, infancy, industries, education, geography and other characteristics.

The first mortality tables of any scientific value were created by the American Society of Actuaries (“SOA”) in 1916. The tables were constructed using the 1910 U.S. Government census data and deaths recorded in 1909-1911 in certain northeastern states, and were representative of the population in that region.

Through the ensuing years, numerous mortality tables have been created by the SOA, U.S. Government and others. These tables have been used to price life insurance, annuities, business contracts, and many special applications, and have evolved through much iteration. The most common use of a mortality table is to estimate the life expectancy of a person. The practice, science or art of determining the estimated remaining life of a person is known as “life expectancy underwriting.”

Estimating How Long Someone Will Live Is Based On Established Sciences

At an early age, most everyone intuitively knows that it is not possible to exactly determine when a person will die, except for forced situations. However, numerous business deals and contracts rely on such estimates. When a life insurer receives an application for a new life insurance policy, the insurer gathers data based on the applicant’s age and health conditions to estimate how long the insured may live. The same thing happens, more or less, with an annuity contract and when a life insurance policy is sold in the life insurance secondary market.

When someone estimates a life expectancy, they typically use confidential medical information to create a series of debits for unhealthy conditions and credits for healthy conditions, which are totaled to a score that indicates if the person may live longer or shorter than average. If the score is greater than 100, the person is expected to live longer than average (a higher score means more health issues exist). If the score is less than 100, the person is expected to live longer than average. This scoring process is known as the “debit/credit methodology,” and the score is the person’s mortality rating, or relative mortality. For example, a mortality rating of 200% would mean that an insured (or, more accurately, a group of similar people with the same mortality rating) would be expected to die at twice the rate of death of a normal, healthy population. The score, or mortality rating, is applied to an actuarial mortality table that is selected to be most representative of the population being evaluated. The product of the mortality rating applied to the mortality table gives the probabilities of dying (and living) every year, and this forms the basis for computing an insured’s life expectancy. Here are some of the conditions that are often considered in the scoring:

1. Uncontrolled high blood pressure, elevated cholesterol, obesity and other cardiovascular risk factors
2. Decreased kidney function
3. Depression and mood disorders
4. Asthma, emphysema, sleep apnea and other respiratory impairments
5. Diabetes and uncontrolled blood sugar levels
6. Cancers other than skin cancer
7. Coronary artery disease, heart valve impairments, cardiac arrhythmias, heart failure, and other cardiovascular impairments
8. Stroke or TIA history
9. Memory loss or other possible symptoms of dementia
10. Morbid obesity
Other factors may be considered, depending on individual situations and who is estimating the life expectancy.

Some mortality tables represent populations from birth. Some represent only people of older ages. Some represent smokers and non-smokers. After applying the score to the appropriate mortality table, a specific cumulative survival curve is created for the individual. This curve starts at the person’s current age and reflects the chances that a person will live into the future. Because most people generally exhibit a higher probability of surviving (living) at early ages, the curve typically is relatively flat early on. The curve will then gradually decrease as age increases to the point at which 50% of all people represented by the curve are expected to be living (or 50% are expected to have died). That 50% point on the curve will approximate the age that will be recorded as the person’s life expectancy, i.e. 50/50 chance of being alive. But of course, the person may well live longer. The probability of continuing to live decreases as the curve continues down with age. Eventually, at about age 100 to 105, the curve will project a low chance of surviving.

The life expectancy number is an “estimate” based on medical records, population data that made up the mortality table, selection of the correct mortality table and the skills of the experts interpreting the medical data. The skills of the experts are critical, and can result in wide variations of life expectancy estimates. It is important to understand that a life expectancy is an average. For example, a 95 year old male, non-smoker with a mortality rating of 200%, would have a life expectancy of about two years, according to the 2008 Valuation Basic Mortality Table3. This does not mean that all 95 year old male, non-smokers would die in precisely two years, but rather that – as a group – they would die, on average, in two years. 25% might die in one year, 50% in two years, and another 25% in three years. This would give an average life expectancy of about two years – but some would live shorter and some would live longer.

The assigned risk category will determine the policy premium cost and/or whether or not a life insurance policy will be issued.

Life expectancy underwriting for life settlements4 is both similar to and different than underwriting by insurers for the purchase of a life insurance policy. The similarities relate to the general methodology used to evaluate risk, while the differences pertain to the demographic characteristics of the life insurance versus the life settlement market. For example, insureds who decide to sell their life insurance policy in the life settlement market tend to have higher income levels than the average insured. This income differential correlates with longer life expectancies in the life settlement market that have to be accounted for in the underwriting process. Another important difference between life insurance and life settlement underwriting has to do with the shape of the mortality curve used to estimate life expectancy. Mortality rates associated with a life settlement population tend to be lower than those associated with a life insurance population in the years just following underwriting. However, as the level of impairments increase among the life settlement population, the mortality curve changes, i.e., it becomes steeper as it approaches the point at which 50% of the population is expected to have died. This phenomenon is not reflected in life insurance mortality tables because life insurers will not underwrite an individual with significant impairments.
Although the debit/credit methodology is common to both life insurance and life settlement underwriting, its application is more complex for a life settlement and requires more adjustments. Life insurance underwriting generally involves a younger, healthier population. Mortality rates, therefore, reflect the experience of this younger, healthier group, which generally don’t change dramatically from year to year. Life settlements, however, involve an older age population, generally ages 65 and older. Life settlement underwriting requires more adjustments to the debit/credit methodology and requires underwriters with a higher level of medical experience. In an older population, impairments – for example, prostate cancer - often move more slowly than in a younger population. Also, the risk factors for life settlements are different. For example, for a 35 year old, there would be concern about cardiovascular risk factors, such as elevated cholesterol or a family history of heart attacks at a young age. However, by the time this person is 75 years old, cardiovascular risk factors would be less important. At this point the risk is based on actual cardiovascular impairments, not a risk factor suggesting a propensity for those impairments. If, on the other hand, cardiovascular disease has not manifested in the 75 year old, there is a lesser likelihood of developing cardiac disease, in spite of the risk factors.

Annuity Contracts and Life Settlements Share Similar Life Expectancy Risks

Life insurers issuing life insurance policies will generally experience higher profitability if an insured lives longer than assumed when the policy was issued, thus delaying the payout of the policy. Insurers issuing annuity contracts, on the other hand, will experience less profit if the annuitant lives longer than initially projected. However, insurers often price the contract to the annuitant using the longest life expectancy possible, because that projects distributions to the annuitant for more years (an encouraging sales tactic). Underwriters for annuity contracts utilize the same information that is used for life insurance policies, but often they don’t develop in-depth evaluations of health, and often only use age and assume the annuitant is in excellent health. Substandard and very large annuities will sometimes receive more rigorous underwriting. Annuity insurers typically do not assign the insured to a risk classification.

A life insurance settlement transaction has the same risk profile for the investor as the annuity does for the life insurance company. However, since a settlement requires that the policy be competitively bid by several buyers, a meticulous life expectancy evaluation is required. To establish the life expectancy estimate, the insured’s health records are submitted to a professional life expectancy underwriter, who does much the same thing as a life insurance underwriter, but with more diligence.

The balance of this paper focuses on the practices of life expectancy underwriters as applied to the sale of life insurance policies in the secondary market.

Life Expectancy Underwriting For The Sale of A Life Insurance Policy Has Evolved Through Several Stages

The history of life expectancy underwriting evolved in two materially different periods. The first period began in about 1989 when individuals with AIDS were facing terminal health conditions, and sought cash from the sale of life insurance policies to pay immediate medical expenses and living costs. This period was designated as the “viatical settlement period.” The AIDS situation enabled investors to provide needed cash to these individuals in exchange for their life insurance policies, which also returned attractive profits to the investors. This period continued until medical advances created treatments that changed HIV/AIDS from a terminal illness to a chronic one, and enabled such individuals to live to more normal life expectancies. The second period began in about 2000/2001 and continues today, focusing on the purchase of life insurance policies where the insureds have more normal life expectancies, or have other identifiable and measurable health impairments. This period is known as the “life settlements” period.
The use of life expectancy observations in the viatical and life settlement industries dates to 1994. In the first six years (1989 to 1994) of the viatical settlements industry, life expectancies were not widely needed or used since almost all policies sold belonged to individuals diagnosed with AIDS, and their LEs were very short – often two years or less.

The AIDS period created an expectation that an investment would return profits in two years or less. But as treatments for AIDS became more successful in the late 90’s and LEs increased, investor ROI (Return on Investment) expectations lagged behind the lengthening LEs. The longer life expectancies motivated investors to search for shorter LEs that met their investment appetite, which in turn put pressure on policy producers and LE underwriters to identify insured with shorter LEs. This caused policyholders with longer LEs and attempting to sell policies to be in conflict with investors seeking shorter LEs. The policyholders put pressure in LE underwriters to favor shorter LEs, and the investors put pressure on LE underwriters to issue longer LEs to be conservative.

The first model for creating life expectancies for the sale of life insurance policies was created a mere 16 years ago, in 1994, by American Viatical Services, now known as AVS Underwriting (“AVS”). The model focused on HIV/AIDS cases. That initial evaluation model was based on existing treatments and perceived future improvements in treatments for AIDS. At the time, some investors used in-house staff to provide LE information, and some did not utilize any formal observation of life expectancy for the purchase or sale of life insurance policies.

As AIDS treatment caused LEs to lengthen, there was an aggressive search for “new territory” within the viatical settlement marketplace. Life expectancies had grown to six to eight years and longer for individuals with AIDS, and there was no investor market for policies on insured having life expectancies of that length. Brokers in the life insurance secondary market (“LISM”), along with providers and investors, believed that other terminal illnesses with short life expectancies would be the answer to the declining number of policies that qualified for investment. Brokers sought insureds with Lou Gehrig’s Disease (ALS), pancreatic cancer, severe heart disease and any stage IV cancer because of the potential for short life expectancies. Unfortunately, there was one significant difference between AIDS and other terminal illnesses that could not be overcome. For the most part, AIDS based viatical settlement policies were owned by gay, white, males with non-standard beneficiaries (brother, sister, mother) and fewer resources for financial support (their reason for selling the policy). Policies of insured with other terminal illnesses tended to be owned by middle-aged males with standard beneficiaries (spouse and/or children) and usually having a spouse, children in school, and a mortgage. These policies, while different from AIDS policies, were still considered viaticals. The insureds tended to have strong financial support systems and did not see a need to sell their policies even though their shorter LEs made them “perfect” targets for investors. Because relatively few policies were sold, this segment of the industry quickly lost favor with the industry.

Life expectancy underwriters during this period (1998 – 2000) created models for LEs for insureds having perceived “terminal” illnesses. Some of these models continue today, but they have incorporated changes for new treatments and procedures, and now result in longer LEs for some of the same terminal illnesses. It is important to note that LE underwriting for AIDS and other terminal illnesses was vastly different from underwriting provided by life insurance companies. Life insurance companies quickly label terminal illnesses, as well as older individuals with impairments, as RNA (Risk Not Acceptable) and have little or no experience in underwriting these cases. Thus, life insurance companies do not have the knowledge base (or have chosen to not refine the knowledge bases they have) to evaluate life expectancies for the older insureds who own life insurance policies sought by investors. Because methodologies for the underwriting of life expectancies for older individuals were lacking, LE underwriters had to develop new methodologies without an abundant knowledge base to go on.

The industry was still considered a viatical settlement industry through the 2000 to 2001 time frame, even though life expectancies for sold policies extended out to 96 months. VIATICUS (a CNA insurance subsidiary) was the first company to purchase policies primarily from “seniors” with longer Les. Policyholders typically had numerous impairments, as RNA (Risk Not Acceptable) and have little or no experience in underwriting these cases. Thus, life insurance companies do not have the knowledge base to evaluate life expectancies for the older insureds who own life insurance policies sought by investors. Because methodologies for the underwriting of life expectancies for older individuals were lacking, LE underwriters had to develop new methodologies without an abundant knowledge base to go on.

For the most part, the underwriting of life expectancies for VIATICUS-purchased policies was still “different” than the underwriting used by life insurance companies. The short explanation of the difference between life settlement
underwriting and life insurance underwriting of the same cases is this: for seniors who are relatively healthy, the life settlement debit/credit LE model was typically modified to create fewer debits for the same impairments. This is because the relative risk for most impairment will be less for seniors than for the younger people that generally characterize the life insurance market. At the same time, for impairments of seniors that would result in denial of life insurance applications by insurance companies, i.e., the RNA cases, debits had to be developed for life settlement applications to capture these relative risks.

From 2001 to present, the cases reviewed by LE underwriters have been predominantly “life settlements” with a good mix of relatively healthy and moderately impaired seniors. The years from 2005 to early 2008 included more cases associated with relatively healthy individuals, partly because of the higher concentration of premium financed policies, and partly because more sophisticated investor criteria for purchasing and pricing policies enabled acceptance of longer LEs. Typically, insureds covered by premium financed policies had qualified for “new” insurance within a few years prior to selling the policy (at least through the two year contestability period.) Thus, it makes sense that these insured would not be less healthy than the standard population in that age group. This also suggests that the LE provider experience data will have more representation for healthier lives during these years. Since 2008, the impact of premium financed policies on LEs has diminished as regulatory pressures have all but eliminated them.

Business volume was small for the industry prior to 2001, when there was an impairment concentration on individuals with AIDS. As treatments began to succeed for AIDS patients and LEs became longer, concentration focused on other types of impairments that would indicate shorter LEs, until it was determined that fewer of these individuals actually sold policies. Since 2001, there have been no impairment concentrations other than those associated with the senior market. Average LEs acceptable to investors increased from 90 months in 2000 to 140 months by 2006. As the secondary market for life insurance established a presence from 2003 to 2008 among seniors, life insurance agents, brokers and investors, business for LE underwriters increased dramatically.

Selecting the Most Applicable Mortality Table is Essential to Reliable Life Expectancy Estimates

When developing a mortality table, it is important to use data that is comparable to the population for which it will be used. The life settlement population is older, typically ages 65-85, and has above-average income. Insurance industry data provides a good starting point, but that information must be augmented with information from actual life settlement experience. Fortunately, the life settlement experience database is growing. The experience to date suggests that the average mortality of the insured, in the early years following the sale of a life insurance policy as a life settlement, is lower than the average mortality of the overall population of comparable ages, and lower than the comparable insurance industry population. This is due to many factors, including the lower mortality associated with the higher incomes that characterize the life settlement population, or perhaps the fact that the insured demonstrated sufficient health to qualify for a new life insurance policy only a few years prior. Also, there is evidence that the shape of the mortality curve changes as the overall level of impairment changes. Because of these unique characteristics, most of the life settlement underwriters have chosen to develop their own mortality tables, based on life settlement experience, rather than relying on life insurance or population mortality tables.

How Does the Process of Creating Life Expectancies Differ Among the Major LE Underwriters?

AVS Underwriting (“AVS”), Atlanta based, was the first company to provide life expectancies to the LISM followed by 21st Services (“21st”) in 1998, Minneapolis based. Waco, Texas based Examination Management Services, Inc. (“EMSI”) and Fasano Associates (“Fasano”), Washington D.C. based, entered the market in 2001. Several other majors have since joined the market including ISC Services (“ISC”) in Clearwater, Florida and Advanced Underwriting Services (“AUS”) in Aurora, Colorado. Some major LISM providers and investors have created in-house LE underwriting models, but this practice has not been widely adopted.

The evaluation process for creating life expectancies is similar among LE providers but the tactics employed vary significantly from company to company. Most LE underwriters start with current medical records to determine the medical history of the insured being considered for evaluation, and most use the
The life expectancy estimate is one of the most important variables in pricing policies in the life settlement market. Therefore, it is important that life expectancy underwriters provide transparency in making information available to investors about the results of their underwriting experience.

The following LE underwriters are the current majors in the LISM. They each offer uniqueness and contribute value to the LISM in different ways.

**AVS Underwriting, Atlanta, Georgia**  
(Content for AVS provided by Phil Loy, President.)  
American Viatical Services (now AVS Underwriting) was the first company to provide a life expectancy report to the (then) viatical settlement industry. AVS was formed in 1994 by Phil Loy, with an insurance and biophysics background, and Tom Hodge, PhD who was Chief of Molecular Immunology for HIV/AIDS at the CDC in Atlanta. Together, they developed a prospective evaluation model for HIV/AIDS based on then current treatment and perceived future improvements in treatments for AIDS. By 1998, Loy had begun to develop a debit/credit model to provide life expectancies to the emerging life settlement market. AVS’s advanced IT platform allows for a scalable, efficient and quality controlled underwriting process. Over time, AVS has evaluated more than 300,000 files and has accumulated the largest data base of information of any LE underwriter. AVS has more in-house data in the 70 – 85 age grouping than was used by the insurance industry in developing the 2008 VBT mortality tables. AVS reset its tables in late 2004 based on data through the end of 2003 and again in 2008 based on the 2008 VBT and AVS data through mid-2008.

**21st Services, Minneapolis, Minnesota**  
(Content for 21st provided by Bradley Bahr, Vice President, Sales)  
Founded in 1998, 21st Services is the second oldest LE evaluator in the industry. It created the first software program for evaluating life expectancies, along with a patented, rules-based underwriting model to provide an objective, consistent, replicable methodology. This system allows LEs to be reproduced at any time with the same results due to the elimination to the maximum degree possible of subjectivity in the underwriting process. Over 230 variables are input into the 21st underwriting model, which tracks each medical condition by ICD-9 code. The model is clinically-based and handles interactions of co-morbid conditions. It allows for preferred underwriting, based on a person’s medical history, family history and activity levels. A Medical Advisory Board, comprised of thirteen physicians specializing in oncology, infectious diseases, nephrology, geriatrics, epidemiology, cardiology endocrinology, neurology and outcome based research, assists the company staying current on issues, trends and medical advances. 21st Services also utilizes its MAB physicians and/or its retained Medical Director to assess cases showing evidence of a terminal illness and/or a shorter life expectancy. In 2009, 21st Services introduced the eCLPR as the first on-line longevity report to be used as an insurance planning tool and a pre-screen option for life settlements. In addition to its updated modified mortality tables and additional internal data, 21st Services has commissioned a mortality study of 15 million Medicare records, the results of which will provide the strongest data foundation in the industry.

**Examination Management Services, Inc., Waco, Texas**  
(Content for EMSI provided by Cheri Ward Director of Customer Support)  
EMSI has been processing life expectancy evaluations since 2001. An essential factor in EMSI’s life expectancy evaluations is using medical underwriters with impaired risk underwriting expertise and substantial industry experience to evaluate longevity risk versus premature death risk. EMSI does not adhere to a one-size-fits-all methodology or use only formulas or codes to determine the risk. EMSI’s underwriters create a life expectancy evaluation by combining a medical assessment, review of daily living habits and demographics, actuarial statistics and results from its proprietary actuarial calculator. The calculator not only reflects the 2008 VBT mortality improvement in general population, but also includes different patterns of mortality between the life insurance and life settlement industries. In support of the LE underwriting services, EMSI provides medical record retrieval services, portfolio management and mortality tracking services. EMSI launched the first industry website for life expectancy orders and report retrieval which was the Life Expectancy Fulfillment System (LEFS). LEFS allows for safe uploading of sensitive documentation needed to process life expectancies and securely retrieve completed reports. This system is integrated with EMSI’s state of the art enterprise document management system to enable external and internal customers to obtain fast and worry-free processing of life expectancy orders.

**Fasano Associates, Washington, D.C.**  
(Content for Fasano Associates provided by Mike Fasano, President.)  
Fasano Associates’ LE evaluations are based on medical analysis complemented by actuarial research. Its proprietary mortality tables facilitate cash flow modeling by incorporating changes in the slope of the mortality curve related to the overall mortality rating. Fasano attributes its consistency and accuracy in life expectancies to its physician personnel, where every file it processes is reviewed by at least two physicians. Fasano is the only life expectancy underwriter to integrate physicians into the analytic process, currently having over 20 physicians on staff, including former Chief and Senior Medical Directors from New York Life, Genworth and John Hancock. In 2009,
Fasano developed the Automated Life Expectancy Calculator ("ALEC") as a pre-screening tool for life insurance policy acquisitions and to assist individuals in financial planning. ALEC is a user friendly tool that does not require the assistance of underwriters or other professionals to complete. In 2004, Fasano founded the Annual Life Settlements Conference held at the Fasano offices.

ISC Services, Clearwater, Florida
(Content for ISC provided by Roger Tafoya, Chief Operating Officer)
ISC Services was founded in 2005 with the goal of becoming the “market leader” in providing high quality, customized life expectancy assessments. To support this effort, ISC Services assembled a team of experienced and highly qualified medical underwriters, physicians and actuaries whose primary goal is to deliver consistently accurate assessments by integrating all three disciplines and using the strictest quality control methods. In support of its professional staff, ISC Services has developed a proprietary LE calculator, a proprietary electronic underwriting manual, and a proprietary software system to efficiently manage the flow of business and create seamless and secure communications via their website. ISC Services claims to be unique in its ability to use table ratings, extra deaths, temporary flat extras, and to provide individual mortality based on impairment specific curves. ISC Services calculator includes the unique capabilities to “wear off” the excess mortality and correctly “age-up” LEs by reentering the mortality curve, at the right time, when re-dating an LE. ISC Services is continuously analyzing it’s research and mortality experience to ensure it attains its goal of providing consistently accurate assessments.

Advanced Underwriting Solutions, Aurora, Colorado
(Content for AUS provided by Traci Davis, President)
AUS manages a virtual network of medical clinicians and underwriters having extensive experience in evaluating life insurance risks, with a focus on senior and affluent markets. Their reviews are tied to a stringent secondary review process to ensure consistency. The underwriters have prior reinsurance underwriting experience and are trained to assess mortality risks in an unbiased and consistent manner. The AUS philosophy is to utilize underwriting principles that have a long track record of success and are appropriate for the risks in the LS market. AUS uses proprietary mortality tables that have been developed by Lewis & Ellis Actuarial Consulting Inc., since 2006. In addition, AUS utilizes a “preferred” table and internally developed parameters in its underwriting to identify lives that have a better than standard life expectancy. AUS claims to have not wavered from its originally designed tables. AUS stays current on changes in mortality and underwriting practices by utilizing experienced actuaries and by providing ongoing consultation to the life insurance market as out-sourced underwriters and auditors. AUS introduced the PRO-LE (provisional life expectancy review) to compliment their full LE assessments. Using the PRO-LE, AUS contacts the policy insured directly, completes a comprehensive telephone interview, and obtains an updated medical history to help identify any drastic health changes. The purpose of the PRO-LE is to confirm the need for a full LE underwriting for only the policies an investor seeks to purchase.

Changes in Life Expectancy Underwriting Will Continue
...The Human Body Is Not In Stasis

Human life expectancy is a constantly changing (dynamic) parameter, due to changes in medical status, lifestyle, socio-economics, and healthcare advancements. In the U.S., life expectancy (as measured from birth) has increased from just less than 50 years in 1900 to just under 80 years today. While average life expectancies have changed, individual life expectancies can change even more dramatically based on the specifics of a particular medical history.

The issue of accuracy in estimating life expectancy has become a paramount issue for all of the LISM stakeholders. According to Traci Davis at AUS, seniors generally live with the effects of chronic illnesses and co-morbid disease processes to which there are no real “silver bullet” cures, or enjoy the benefits of improvements in therapies that provide significant changes in mortality. But as regards “preferred risks”, a number of now distressed portfolios may have been significantly impacted because of adverse preferred selection, i.e., insured identified as preferred risk by insurers but not identified by LE underwriters as having longer than standard life expectancies among seniors. Unlike life insurers, the LISM LE underwriters do not have tools to provide levels of preferred risks, e.g., current age/amount requirements with the ability to obtain additional information. Traci comments, “It’s amazing that such a key issue for portfolio management is not available to LE underwriters or investors while they focus on changes to mortality tables.”

In 2008, all life expectancy underwriters lengthened their LEs, either by making adjustments to their underwriting methodologies, or by instituting changes to their proprietary mortality tables. The changes resulted from a combination of studies of their own internal data as well as the newly released SOA 2008 VBT tables that indicated improved mortality for the senior population. For most of the LE providers, this resulted in longer LEs and significant consternation in the industry. Vince Granieri, CFO and Chief Actuary for 21st Services, notes that “it is not likely we will see medical advances that will dramatically increase seniors’ LEs, but we may see debits and credits continue to change.” Vince explains, “It was a combination of the emergence of life settlement data, the fact that life insurance tables are static and do not include automatic adjustments for future mortality improvements and real differences between life settlement mortality and life insurance mortality that led to the changes. Although there is a chance that this could happen again, the chance is slight because LE providers are now using life settlement mortality as their basis for mortality tables, some LE providers include provisions for future mortality improvements, and medical advances similar to protease inhibitors for AIDs are unlikely—
especially for senior populations - and my research suggests ultimate convergence of mortality for all senior populations be they life settlement, life insurance or the general population."

The underlying considerations and methodologies used in making the adjustments are complicated and are a subject for a separate research study. Suffice it to say that the changes caused substantial reason for investors to hold back from investing in life insurance policies, resulting in demand and pricing decreases into 2010.

Much of the improvements in older age mortality have been the result of a halving of cardiovascular mortality over the last 20 or so years. This improvement is the result of many factors: better surgical techniques with bypass and stenting; better diagnostic technology such as echocardiograms; lifestyle modifications such as less smoking; and drug developments such as anti-hypertensive medications and statins.

While it may be difficult to identify specific medical advances as accountable for sharp increases in mortality extensions, new medications and treatments have created, and will continue to create advances that can cause material extensions in specific classes of medical impairment. When this happens, Traci Davis suggests that improvement in mortality from such developments should be reflected as a “credit” during the underwriting process where the effects for an individual can be evaluated rather than make changes to mortality tables.

The history of LE underwriters has always been a history of change, with some asking when to expect a cessation of “change.” There may never be a time when the LE providers will stop changing. As pointed out, adjustments have occurred because the treatments for disease have progressed, the types of impairments have changed, the demographics and characteristics of insureds have changed, and because there was a strong resistance of the marketplace to embrace change. The LISM will continue to change because the market will continue to seek the perfect “fit” for its needs. AIDS gave way to other terminal illnesses, which gave way to seniors with lots of impairments, which gave way to seniors with less impairment, which gave way to premium financed policyholders, which gave way to seniors who are healthy or have only a few impairments. For the most part, all life settlement evaluations have been for high net worth seniors. If, in the future, seniors with lower net worth become active in selling life insurance policies, their living profiles will add change to the current LE evaluations. Further, it is uncertain what impact the new healthcare bill will have on life expectancies of senior citizens in this country.

The industry could and should expect some changes in life expectancies in the future. The next update to the VBT mortality tables is expected in 2012, but LE underwriters are not expecting large changes as was experienced in 2008, and there will probably not be wholesale changes across all impairments. There will be fine tuning by impairment, as statistical data becomes more understood and used within the industry.

LE Underwriter Practices Are Not Without Issues And Concerns

At the 2009 Fall LISA Conference, the adoption of Best Practices for LE underwriters was announced. The Best Practices were developed by a Task Force, Chaired by Mike Fasano and consisting of AUS, AVS, EMSI, ISC, Fasano and 21st Services. The purpose, as stated by Fasano, “Best Practices will increase transparency among the LE Providers and should help to restore investor confidence in our industry”. A goal was to establish a standard method for calculating actual to expected underwriting results. To further the goal, the 2010 LISA Common Actuarial Tables (“CAT”) were developed and released at the April, 2010 LISA conference in Washington, DC to compare the actual to expected results among all LE providers. The Tables and Best Practices are in the process of further analysis in an effort to provide the most useful information to the industry.

Gaining consensus and adoption of “best practices” is not without issues. LISA representatives have stressed that the purpose of the CAT is in performing Actual to Expected analyses, and that it is not intended for pricing or other purposes. Investors are asking: why not use it for pricing if it is appropriate for Actual vs. Expected measurements? The reality, however, is that most LISM stakeholders do not have access to LE underwriter specific and proprietary base mortality tables unless they are purchased. In this situation, a base table that is believed to be the most accurate, available, and appropriate for a given situation needs to be selected. The most common such table is now the 2008 VBT. According to Scott Gibson, actuary with Lewis & Ellis, Inc., whether or not the common table should be the CAT is a “good question.” Scott answers,
“Likely, but the CAT has little current utilization. More real analysis and testing needs to evolve before any official shift to the CAT as a standard should occur.”

The answer to selecting an optimum mortality table lies in how life expectancies are created by the underwriters. The determination of an underwriter’s accuracy in estimating life expectancies starts with assigning debits/credits to estimate a mortality rating as described above. Then the underwriter applies the mortality rating to a selected mortality table to solve for the life expectancy. However, mortality tables can differ; for example, one may have a pattern of 25%/50%/25% or another 10%/80%/10%. By comparison, the 25%/50%/25% represents more deaths in the early period, less in the middle period and more in the later period. When valuing a life insurance policy for settlement, using a mortality table that represents the pattern most fitting for the insured is essential because the projected cash flows and the IRR will be directly affected by the slope of the curve. Thus, selecting the CAT for pricing cannot be assumed to be correct if the LE was based on a mortality rating that was applied to a table having a materially different pattern. One can argue that optimum pricing requires use of the same table used by the LE underwriter when determining the LE.

The task of measuring accuracy of LE underwriters in estimating life expectancies is also affected by the mortality distribution. For example, if one hundred 95 year old male, non-smokers were underwritten at the same time using a 25%/50%/25% mortality table, 25 would be expected to have died at the end of period one. But if you use a 10%/80%/10% mortality table, you would expect 10 to have died at the end of period one. So if 10 deaths actually occurred, the measurement using the 25% table would be 10/25, or 40%, but the measurement using the 10% table would be 10/10, or 100%. Clearly the reported results are confusing. Thus, the goal is for all LE underwriters to use the same CAT table to get comparable results.

Other concerns about LE underwriter practices have been noted, but not all underwriters agree with these criticisms. For example, some believe that there are not enough variables employed to determine the health and mortality risk factors in rating an individual’s probable mortality. And some believe traditional health variables have been based on models developed to eliminate populations having higher health risks, while assessing the mortality related risks of populations having lower health risks. This type of modeling is inadequate for the LISM, where investment risks hinge on individuals whose profile would be the polar opposite.

Dr. Stephen Eldridge has stated that the “interdependency” factor (how different variables interact) of co-existing medical conditions has a tremendous impact on life expectancy. He believes that greater study of the interaction of disease entities can lead to more precise life expectancy evaluation. Most members of the human race are afflicted with at least three classified medical conditions. This interdependency issue can be illustrated by two relatively common disease entities: 1) degenerative arthritis and 2) acid related gastrointestinal diseases (reflux/ulcers). Either one of these medical conditions alone does not typically result in earlier death. However, when they exist together, there can be a predictable reduction in life-span because of the pharmaceutical treatment of these diseases. Dr. Eldridge notes that there are hundreds of similar scenarios that exist among the population.

Dr. Eldridge further notes that mortality tables serve the insurance industry well where the primary endeavor is to eliminate high-risk populations while assessing the mortality related risks of low-risk populations. On the other hand, the LISM is looking for risk assessment related to a high-risk and aging population. Tables and mortality curves alone cannot adequately measure and predict the complexities related to human life.

Life expectancy valuations are the most determining variable in projecting and monitoring life insurance investor returns. Updated periodic portfolio reports should be based on updated medical records to insure accuracy and meaning for any valuation methodology. If an individual insured’s medical data set is not kept current, portfolio revaluation updates are nothing more than a chronological extension of the original underwriting reports, and will not reflect evolving and changing mortality predictions. Such reports can materially understate the portfolio valuations by missing critical changes in the insured medical variables.
If initial LEs are prepared as thoroughly and accurately as possible at that moment, then subsequent health-based changes in insured LEs are more likely to deteriorate rather than improve. And changes in individual morbidity will more likely increase at rates greater than general improvement in mortality tables, thus the absence of updated medical records should be expected to cause portfolios to be understated in value.

Ciaran Brady and Brian Mulconrey report in the Life & Health National Underwriter that a move to digital personal healthcare records (“PHR”) is underway. There are a number of PHR services that have come into the market over the past few years, including two of the biggest: Microsoft (HealthVault); and Google (Google Health). Both of these companies have released free services designed to help consumers control their health records in a secure environment. From a risk management perspective, both of these companies also have a great deal to lose if they fail to securely manage the health records entrusted to their platforms.

Also noted by Brady and Mulconrey, Interactive Data Corporation (“IDC”) recently projected that the number of Americans with electronic health records maintained by their healthcare providers will increase from 14% in 2009 to 25% in 2010, due largely to the massive $19 billion investment in health record adoption over the next five years, authorized by The American Recovery and Reinvestment Act of 2009. Others believe this number will increase to 80% because the Federal government mandates stipulate that hospitals must have all medical records digitalized by 2012, and all medical providers must have records digitalized by 2015. Concurrently, regional health information exchanges (RHIOs) are being established to facilitate the sharing of health records with authorized entities. Further, Brady and Mulconrey point out that “the (life insurance) industry is already doing over 95% of the work involved in creating a personal health record for the customer.” These developments will open opportunities for easier access to medical records, which will lead to more accurate and lower cost LE updates.

Pending and Future Developments Indicate More Sensitive and Responsive Systems

New developments are in the works for life expectancy underwriting. The most immediate is the advent of online “do-it-yourself” data entry systems. These systems typically enable consumers to enter personal medical and living data, and in return obtain life expectancy estimates. While these systems may allow individuals to manipulate data to get a desired answer, they do enable consumers to consider their life expectancy relative to retirement planning, long-term care arrangements, annuities and, of course, selling a life insurance policy. There is material value in these systems to help seniors with their general planning; however, these systems alone are not adequate for major financial decisions and should be augmented with more sophisticated life expectancy estimating services. Refinements in these systems should occur as data entry technology and mortality algorithms advance. Examples of such systems include: AXA, MSN, Gosset at the Wharton School, Peter Russell, Minnesota State Retirement System, MetLife, Northwestern Mutual, Virtual Age, and many others. Tests of these returned wide ranging life expectancy estimates for the same person. These online systems do not measure up to medically underwritten LEs.

On the other hand, Vince Granieri, CFO and Chief Actuary for 21st Services, which claims to have pioneered self-reporting, automated underwriting systems with its 21st ECLPR series, states “If the client is truthful with their responses and answers each question faithfully, the ECLPR will provide a reasonably accurate LE estimate. With our experience in developing underwriting algorithms, it was logical to extend the process backward into a self-reported product.”

Mike Fasano cautions that automated methodologies can be flawed to the extent that it makes simplified assumptions in its underlying logic, and to the extent that automated methodologies cannot fully account for the clinical context of diseases. Fasano notes: “There can be huge differentials for the same disease in both life expectancy and the pattern of mortality over time. These differentials are a function of the unique risk profile an individual has, which in turn is a function of many variables – clinical or functional status, underlying cause, staging of the disease, and so on.” However, Fasano Associates has developed its own automated life expectancy
calculator, ALEC©, which is intended only as a screening tool. He notes, “We used our clinical and underwriting expertise to identify those conditions that are most often found in the over-65 demographic that characterizes the life settlement market, and those conditions that most often result in additional mortality risk. By taking this approach, we believe ALEC offers good risk differentiation while being easier to use.”

Insurance Studies Institute (ISI) is aware of other new proprietary technologies in research and development. The focus of these developments seems to be on identification of characteristics that project a greater or lesser probability of dying earlier, when compared to life expectancies created with current underwriter practice, and on developing efficiencies. The incentive for developing these new methodologies stems from investor demands to avoid the disruptions caused to life insurance policy portfolios when the VBT 2008 table (along with other mortality changes) caused life expectancy underwriters to adjust their life expectancy estimates.

Two specific, newer systems in various stages of development are mentioned here only to illustrate some directions of LE underwriting advances. These systems have not been tested or verified, and are not endorsed by the authors or ISI.

One is the Longevity Cost Calculator (“LCC”) which was developed by Life Settlement Financial, LLC (“LSF”). LCC is a web based tool created as an alternative LE methodology for use in portfolio aggregation and valuation. The LCC LE is created by an insured (or by the insured’s proxy) responding to a series of 76 questions which cover: current and limited past medical conditions; subjective health status, habits and behaviors; height and weight; a variety of daily activities; range of motion; mental status; and name of respondent. The LCC assigns the insured to one of four classifications:

- Generally healthy with lowest level of impairment
- Poorest subjective health, largest number of medical conditions, non-institutionalized, low mortality
- High mortality rates, few medical conditions, few impairments, relatively good subjective health
- High mortality rates, high levels of physical and cognitive disability and institutionalization

LSF claims the system has safeguards to minimize manipulation of data inputs to favor a longer or shorter LE.

Another system is being developed by Physicians Mortality Rating Services (“PMRS”) to take advantage of the rapidly maturing digitalization of medical records. The PMRS system devotes specific attention to disease severity, family history data and a few select medical conditions. PMRS seeks to assure internal reproducibility of generated LEs and to be measureable by reverse statistical analysis. It endeavors to assure:

- Interdependent nature of health and co-existing disease related variables.
- Avoidance of inaccurate variables and misapplication of significant variables.
- Identification and tracking of changing variables.
- Adjustments for unusual or severe life threatening medical conditions.

Fasano Associates continues to research disease patterns to identify differential patterns for certain diseases by age. Its goal is to apply disease patterns most fitting to the more homogeneous characteristics that typify the older ages and higher than average income of the life settlement market. Fasano also continues to analyze patterns of mortality of seniors related to overall mortality ratings and develop mortality curves that reflect the differential patterns.

In addition, to address the lack of liquidity in the cash and synthetic longevity markets for life settlements, Fasano Associates has created the Fasano Longevity Index (“FLI”). While previous attempts at developing an index for the LISM have been unsuccessful, Fasano notes several differences in the FLI that enable the index to capture the attractive risk/return characteristics of the LISM: a) it is based upon a proven successful medical underwriting track record; and b) it links cash policy returns to the index by referencing a synthetic policy for each of the 45,000 unique lives selected from the 135,000 lives in the Fasano Associates database.

AVS in continuing its ongoing research of death progression among defined cohort groups that comprise its substantial dataset. Disease progression among all major impairment
In addition, AVS is developing mortality curves based on experience of death specific groups. These curves, when fully developed, are expected to provide specific mortality information to the LISM and add substantially to the valuation of life settlement transactions.

AVS is also working with several life reinsurance companies to create reinsurance programs to guarantee the cash flow of life settlements portfolios. These reinsurance products are expected to be available during the summer of 2010, and will provide added security for investors as well as protection for future securitizations of portfolios.

21st Services has launched a five-year initiative to compile mortality data from 15 million Medicare records through the Chronic Disease Research Group. Because growing a pool of unique life settlement data takes many years, 21st Services is sponsoring this study of senior mortality data to accelerate the accumulation of data applicable to seniors to enhance LE underwriting methods. The study uses a 5% sample of the Medicare population (ages 65 and up) each year from 1992 to present, and records each medical diagnosis documented by ICD-9 code. The research is expected to link various medical conditions to the probability of survival for individuals exhibiting those conditions. 21st Services is also conducting sophisticated regression analyses of its data base of 80,000 unique lives and 5,000 deaths to further validate and refine its underwriting philosophy.

21st Services is working on a research paper comparing mortality rates and other pertinent information from its data to that of life insurance populations and the general US senior population. This paper has been accepted for publication in the 2011 Society of Actuaries’ Living to 100 and Beyond Symposium. Vince Granieri of 21st Services reports that “the research concludes that mortality rates for the life settlement, life insurance and general populations differ considerably from the outset, but later converge much sooner than the typical 25 year select period inherent in many life insurance tables. The rate and degree of convergence varies inversely by age with the mortality rates of younger populations converging at later durations and of older populations converging at earlier durations.”

ISC Services continues enhancements to its LE calculator, the latest of which allows for the “wearing off” of the excess mortality and the ability to properly “Age Up” LEs by re-entering the mortality curve at the right point when re-dating an LE. In addition, ISC Services expects to soon launch its new Fast Track LE which is an automated life expectancy assessment that enables users to pre-assess whether a particular policy will qualify for settlement.

AUS has a new service offering for fund managers that provides medical records procurement and pharmaceutical database evaluations on portfolios. Additionally, AUS has developed a tracking product that combines the art and science of underwriting and pharmaceutical profiling, called “Red Flag Underwriting,” that significantly reduces post-purchase LE costs.

In July, 2010, Scott Gibson and Jackie Lee of the Dallas office of Lewis & Ellis, Inc. released the “Lewis & Ellis LE Calculator (“LE Calculator”).” The LE Calculator is an Excel tool designed to calculate a wide variety of LE’s and multipliers depending on input factors such as mortality table, age, gender, smoking class, and mortality improvement. Tables used in the LE Calculator (all public) are the 2001 VBT, the 2008 VBT, and the 2010 LISA CAT. According to Scott Gibson, “The LE Calculator is not a replacement for LE underwriting. It is simply an effective means of comparing various LE combinations utilizing base public mortality tables and parameters.”

Other industry research and developments are known to be ongoing, and other academic research is known to be in progress at several advanced educational institutions; however, details have not been released as of this publication.

Conclusion

Human life expectancy is a constantly changing dynamic, and the ability to predict an individual’s life expectancy will be a forever improving science. Due to changes in medical status, lifestyle, social-economics, and healthcare advancements, life expectancy (as measured from birth) in the U.S. has increased from just less than 50 years in 1900 to just under 80 years today. While average life expectancies have changed, individual life expectancies can change even more dramatically based on the specifics of a particular medical history. Gaining access to accurate medical
A premium financed life insurance policy is one for which the policy owner has entered.

A “life settlement” is the sale of a life insurance policy by the policyholder to an investor. Traci Davis is President of Advanced Underwriting Solutions, Aurora, Colorado.

“Sources and Characteristics of The Principal Mortality Tables”, 1919, Henry Moir. This paper does not get into the technical structuring of mortality tables. Just assume such changes across all impairments. There will be fine tuning by the industry could and should expect some changes in life expectancies in the future, but barring a major medical breakthrough, nothing dramatic is anticipated. The next update to the VBT mortality tables is expected in 2012, but LE underwriters are not expecting large changes as was experienced in 2008, and there should not be wholesale changes across all impairments. There will be fine tuning by impairment, as statistical data becomes more understood and utilized within the industry.

11 Continued

Life expectancy considerations differ among life insurers, business structures, annuity writers, pension administrators, long-term care services, reverse mortgage products, life settlement investors, and retirement or estate planners. But for all these factions, the impact of future advances in medical sciences and longevity can be ameliorated by building long-term longevity improvement assumptions into financial transactions.

The life insurance secondary market has been substantially affected by its changing preferences for certain life expectancies, beginning with a focus on AIDS cases and advancing to the current focus on retirees having reasonably normal health, with some impairment. While material changes in LE practices have disrupted investor confidences, the major LE underwriters expect the future evolution of LE underwriting to be more stable.

Online systems to estimate one’s life expectancy are increasing. While such may be revealing, their reliability for major financial decisions remains in question. When used in large numbers, i.e., 1000s of estimates to help assure statistical reliability, try to assure that the online system is focused on a cohort that is representative of the person for whom data is being entered.

Life expectancy underwriting will continue to evolve due to ongoing research, accumulation of data, medical advances, new technologies, efforts to establish “best practices,” and many other variables that affect human longevity. New firms and academic developments currently in process hope to bring enhancements to the LE underwriting industry. Substantial research continues among the major LE underwriters, as they strive to make their work as accurate and reliable as possible for their customers. The critical element is identifying the appropriate or most accurate mortality table for a particular cohort population group. While this science can never be 100% accurate, when applied to large numbers, the predictability and reliability of life expectancies should be expected to steadily improve.

The industry could and should expect some changes in life expectancies in the future, but barring a major medical breakthrough, nothing dramatic is anticipated. The next update to the VBT mortality tables is expected in 2012, but LE underwriters are not expecting large changes as was experienced in 2008, and there should not be wholesale changes across all impairments. There will be fine tuning by impairment, as statistical data becomes more understood and utilized within the industry.

1 “Sources and Characteristics of The Principal Mortality Tables”, 1919, Henry Moir.
2 This paper does not get into the technical structuring of mortality tables. Just assume such tables fairly represent large populations of people and provide average rates of surviving, e.g. at age 75, for example, 50% of all people fitting the table are expected to be living and 50% are expected to have died.
3 The 2008 Valuation Basic Table (“2008 VBT”) is a set of mortality tables suitable for individual life insurance products. The 2008 VBT is composed of a Primary Table and a Limited Underwriting Table, which are sub-divided into Relative Risk Tables. The development of the tables by the Society of Actuaries included $7.4 trillion of life insurance, 75 million policies and nearly 700,000 death claims from 35 contributing companies. The 2008 VBT includes an “ultimate” table which removes the first few years of deaths of insured persons who have been recently issued life insurance policies to more accurately reflect the rate of mortality. People who are issued a new life insurance policy typically have had a recent medical exam and are relatively healthy, so the ultimate table attempts to remove that effect.
4 A “life settlement” is the sale of a life insurance policy by the policyholder to an investor. Such sales typically occur after the insured’s age of 70 and because the policy owner no longer wants the policy, cannot afford it, or seeks to realize a current value for the policy rather than wait for the policy to mature upon the insured’s death.
5 Most states define “terminal” as anyone having a life expectancy of two years or less.
6 A premium financed life insurance policy is one for which the policy owner has entered into a program that provides borrowed funds to pay the premiums. Generally financing is collateralized by the policy death benefits. It is noted here that a premium financed policy is not necessarily a “STOLI.” A STOLI is a life insurance policy that is promoted and financed by a stranger of the insured, but for the purpose of the stranger to profit from the future sale of the policy.
7 A “contestability period” is established by insurance laws in all states. The purpose is to allow a life insurers reasonable time to examine and verify all facts provided by the insured applicant. If information submitted by an applicant is found to be invalid, the insurer has a right to rescind the policy within the two year contestability period.
8 Traci Davis is President of Advanced Underwriting Solutions, Aurora, Colorado.
9 Dr. Stephen Eldridge is Medical Director of Physician’s Mortality Rating Service
10 Life & Health National Underwriter, By Ciaran Brady and Brian Mulconrey, 3/8/10