Emerging Trends in Mortality and Longevity Symposium 2011
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Life Insurance Underwriting in the United States: Yesterday, Today and Tomorrow

Agenda

• Basic types of underwriting in the US
• More recent developments in types of underwriting
• Underwriting Tools used in US
• What is new in underwriting?
• How to quantify the impact of underwriting on mortality experience
Detailed Agenda

• Basic types of underwriting in the US
  – Fully underwritten
  – Medical / Paramedical
  – Nonmedical
  – Simplified Issue
  – Guaranteed Issue
  – Guaranteed-to-issue
• More recent developments in types of underwriting in the US
  – Smoker/Nonsmoker and Preferred underwriting
  – Older age underwriting
  – Simplified issue underwriting
  – Other underwriting types

Detailed Agenda (cont’d)

• Underwriting Tools used in US
  – Application
  – Blood testing
  – Urine testing
  – Oral fluid
  – Tele-underwriting
  – Pharmaceutical database
  – Inspection report
  – EKG, treadmill
  – Chest x-ray
  – MIB (Medical Information Bureau)
  – MVR (Motor Vehicle Record)
  – APS (Attending Physician Statement)
Detailed Agenda (cont’d)

- What is new in underwriting?
  - Laboratories
  - Other vendors
  - New medical markers
  - Predictive analytics
  - Other considerations
- How to quantify the impact of underwriting on mortality
  - New underwriting
  - Existing underwriting

Underwriting Basics in US

- “Yesterday, all my troubles seemed so far away.” Beatles
- Fully underwritten
  - Full application with general (Part 1) and medical (Part 2) questions
  - Paramedical or Medical Exam
    - Typically height/weight measurements, blood pressure, pulse rate, blood draw and urine sample, medical questions
    - For medical, add brief additional exam (e.g., listening to heart)
  - Blood test
    - HIV, diabetes, kidney and liver disorders, cholesterol and other lipids, immune disorders, PSA (Prostate Specific Antigen) for males
  - Urine test
    - Cotinine (smoking), cocaine and other drugs, medications
Underwriting Basics (cont’d)

- Non-medical
  - Also considered fully underwritten because same application used
  - However, medical / paramedical, blood and urine testing not done
- Simplified issue
  - Less than a full set of medical questions
  - No medical / paramedical, blood or urine
  - However, other tools may be used
  - Practices vary widely

Underwriting Basics (cont’d)

- Guaranteed issue
  - No or a few medical questions
  - No medical / paramedical, blood or urine
  - Cannot be turned down for coverage, with a few exceptions
    - May depend on age and possibly if live in a nursing home or LTC facility
  - Small face amounts and return of premium for death in first two years
- Guaranteed to issue / Guaranteed acceptance
  - Similar to guaranteed issue coverage is guaranteed, however, can be rated
  - Benefits usually limited (e.g., return of premium)
More Recent Developments in Underwriting Types

- “Today is the greatest day I have ever known.” Smashing Pumpkins
- Smoker/nonsmoker underwriting
- Preferred underwriting
- Older age underwriting
- Simplified issue underwriting
- Other underwriting types

Smoker/Nonsmoker Underwriting

- Began about 1980
- Was first type of preferred underwriting
- Definition of smoker varied and evolved
  - No cigarettes; occasional pipe, cigar, chewing tobacco ok
  - No nicotine in last year, 2 years, 3 years
  - Never smoked
Preferred Underwriting

-Began in late 1980s with AIDS scare
-Common elements of preferred underwriting
  - Alcohol and drug abuse
  - Blood pressure
  - Build
  - Cholesterol
  - Family history
  - Motor Vehicle Record (MVR)
  - Personal medical history
  - Tobacco use
  - Other – Aviation, avocations, citizenship, foreign travel, hazardous activities, residence

Preferred Underwriting (cont’d)

- Evolution over the years
  - More risk classes
  - Move by some companies from the original knockout approach to a debit/credit approach
  - Exceptions vs. business decisions
  - Scoring of criteria for Principles Based Reserves
Older Age Underwriting

• Still developing
• Four components:
  – Cognitive testing
  – Functional testing
  – Older age supplemental questionnaire
  – Changes to traditional underwriting

Simplified Issue (SI) Underwriting

• SI has become more popular, primarily to:
  – Be able to issue the business more quickly
  – Become less intrusive to the applicant
  – Enter new markets
• Information still gathered may include one or more of:
  – MIB (Medical Information Bureau)
  – MVR
  – Rx Database
  – Oral fluid
  – Tele-underwriting
• Idea of SI is to still collect enough information to be able to underwrite the applicant reasonably well
Other Underwriting Types

- Financial
  - Income, net worth
- Policy Ownership
  - Stranger owned life insurance becoming more popular (again) and typically produces different results
  - Lapse rates lower than traditionally expected
  - Mortality may be above traditionally expected
    - Life settlement underwriters may have additional health information withheld from company underwriters
- Remote underwriting
- Outsourced underwriting
- Straight-through processing

Recent Developments in Underwriting Tools

- Oral fluid
- Tele-underwriting
- Pharmaceutical (Rx) database
- Other tools
  - MIB (Medical Information Bureau)
  - MVR (Motor Vehicle Record)
  - APS (Attending Physician Statement)
  - Inspection report
  - EKG, treadmill
  - Chest x-ray
Oral Fluid Test

- Less invasive than blood and urine testing
- Can be done by agent so paramed not needed
- Can determine HIV, cocaine, cotinine and hepatitis (the latter available in Canada, but not US)

Tele-underwriting

- This is where someone calls the applicant to ask them questions
- Person who calls can be from home office or third party vendor
- Person is usually knowledgeable in both health related issues and how to deal with customers
- Questions asked can be verification of information received on the application and/or include drill down questions to find out more about health conditions (or other activities) identified on the application
**Pharmaceutical (Rx) Database**

- Database information collected from Pharmacy Benefit Managers
- Company using database sends request for information on applicant (can also be used at time of claim)
  - Company provides name, social security number, date of birth
- Rx database company provides:
  - Prescription history if there is one,
  - That applicant in the database but no prescriptions found,
  - Or that the person was not found
  - First two considered “hits” and company charged. Not charged in third instance where there wasn’t a hit.
- If drug history, importance of drug listed as red, yellow, green.

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**Other Underwriting Tools**

- MIB (Medical Information Bureau)
- MVR (Motor Vehicle Record)
- APS (Attending Physician Statement)
- Inspection report
- EKG, Treadmill
- Chest x-ray
What is new in underwriting?

- “Tomorrow, tomorrow, I love ya tomorrow. You’re always a day away!” Annie
- Considerations
- Laboratories
- Other vendors
- New medical markers
- Predictive analytics
- Other items

What are some of the considerations driving changes in underwriting?

- Need for speed
  - Looking at new forms of SI
- Age based underwriting
  - There are differences by age, but these just being considered
- Holistic approach
  - Laboratories and others looking at this
- Technology
  - Allows remote underwriting, predictive modeling
- Regulatory
- Is there a better way?
Laboratories

- Have been collecting data for many years and now using it to score individual applicants
- Information on applicants rather than insureds
- Collected death information from Social Security Death Master file
- Performed statistical analytics to determine score, considered correlations

Other Vendors

- Re-evaluate same information but in different ways
  - Research provides different values, weightings
  - Utilize individual company data for research
  - Preliminary results show better accuracy in predicting mortality
- Automated underwriting
  - Can be simple use of company parameters or more sophisticated analysis of data
New Medical Markers

• SOA research project
  – Surveyed labs for tests not used or not used by many yet
  – Studied 11 potential tests
    – Apolipoprotein A and B – Lipid test that can be used instead of cholesterol
    – CBC (Red Cell Distribution width) – Wider variation in widths implies higher mortality
    – Cystatin C – Renal (kidney) function
    – Hemoglobin – Anemia and other physiological diseases
    – Hemoglobin A1c – Metabolism of glucose
    – Microalbumin - Diabetes
    – NT-proBNP – Congestive heart failure
    – Oxidized LDL – Heart disease
    – Phospholipase A2 – Used to predict cardiac event or stroke
    – TNF alpha - Cancer
    – Troponin I and T – Determines if damage to heart
  – Report quantifies mortality savings and cost of test
    – Available on SOA website

New Medical Markers (cont’d)

• Marker to predict life expectancy
  – Blood test to measure telomere length
• Markers to predict Alzheimer’s disease
  – Protein in spinal fluid (1)
  – Measure of increase in DHEA (dehydroepiandrosterone) when blood oxidized (no increase in DHEA in Alzheimer’s patients) (2)
Life Style Based Analytics

- Used more in health insurance, but some beginning to use in life insurance
- Uses consumer data to evaluate applicant, example of two individuals:
  - First just bought new running shoes and subscribes to several healthy living magazines
  - Second just bought new television and couch
- Currently can only use positive information
- Potential privacy issues

Other New Underwriting Considerations

- Recent studies listed generally, but not always from US
- Environment
  - Pollutants linked to diabetes (3)
  - Age of onset of puberty predicts adult osteoporosis (4)
- Geographical location
  - Wide difference in life expectancy by region in US (5)
- Poverty, low levels of education and other social factors (6)
  - US study showed following extra deaths in 2000
    - 245,000 due to lower education
    - 162,000 due to low social support
    - 133,000 due to individual-level poverty
Other New Underwriting Considerations (cont’d)

- Obesity
  - Overweight more harmful to liver than alcohol in middle-aged men (7)
  - Obesity is a killer in its own right, irrespective of other risk factors (8)
  - Dementia link to middle-age obesity (9)
- Diet
  - Diets for elderly after hospitalization decreased mortality rates (10)
  - Eating purple fruit could fend off Alzheimer’s Disease and Multiple Sclerosis (11)
- Exercise

How to quantify the impact of underwriting on mortality experience

- New underwriting tools
  - Testing and validation
  - Protective Value Study
- Established underwriting tools
  - Actual to Expected Study
Testing and Validation

- Process for testing new medical marker
- Gather mortality data
  - Clinical
  - Own
- Review relationships between readings and mortality
  - Example: If higher scores are indicative of higher mortality, must determine reason for lower mortality at higher scores
    - Could be due to lack of data in that portion of study or could be indicative that marker is not a good one
  - Check for J and U shapes in data

Testing and Validation (cont’d)

- Must also validate test
  - Divide mortality data into at least two segments
  - Save second segment for validation
  - Does result of second segment validate results of first (usually larger) segment?
Protective Value Study

- Cost / Benefit analysis done
  - Not as simple as it might sound
- Costs include:
  - Cost of the test itself
  - Time spent by underwriter and other personnel on evaluating applicant for this underwriting, training, etc.
  - Cost for ordering an APS or another test to verify information from this test
  - Time spent analyzing APS or other test
  - Time spent explaining to applicant why they were declined due to this new test
  - If this replaces another test, the mortality savings from the other test is a cost here

Protective Value Study (cont’d)

- Benefit (savings):
  - Mortality savings due to this test / technique
    - Not always easy to assess
    - Primary difficulty is determining how much savings is due to this type of underwriting alone
    - For example, how much savings did the pharmaceutical database provide if the applicant already mentioned the drug or if it was found in the APS – possibly very little or none!
  - Mortality savings due to needing to order an APS or other test and discovering something else, completely different, that wasn’t caught before
  - If new test replaces existing test, cost of eliminated test
  - Sentinel effect reduces savings
  - Results often vary by age, gender, other factors
Actual to Expected Study

- This study is done after experience emerges
- “Actual” is the actual mortality experience
- “Expected” is the expected mortality experience, usually either the pricing assumption or based on a standard industry table
- Actual to Expected (A/E) ratios equal to 100% are at expected while ratios below 100% are better than expected and ratios above 100% are worse than expected
- Can split analysis by issue year, age, duration, gender, risk class, smoking status, policy size, and other categories as desired.

Actual to Expected Study (cont’d)

- This is not a perfect comparison as other factors beyond underwriting come into play, but it is a relatively easy approach to determine the effectiveness of the underwriting that has already been done
Questions or comments?

Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.
The views expressed in this presentation are those of the presenter.

References

(8) LifeExtension, March 1, 2011
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