Current Trends in SI & Accelerated Underwriting

Brian Boger, FSA, MAAA, Mortality Solutions - Pricing
The Life Insurance Challenge
Will we remain relevant in the 21st century?

People want more life insurance, but don’t buy it:

► 40% of Americans who HAVE life insurance don’t think they have enough.

► 70% of households with children under 18 say they do not have enough life insurance. Yet they insure their cell phones!

► LIMRA estimates the unmet life insurance need at over $15 trillion.

► 83% say they don’t buy life insurance because it is too expensive.

► But they overestimate the cost by more than a factor of 3.

LIMRA 2015
Back to the Future
The more things change, the more they stay the same.

1986
- Music on Albums and CDs
- Movies on VHS or Beta
- Dozens of TV Channel Choices
- On Cable & Antenna
- Travel Agents
- AAA Triptik
- Banking in branches

2016
- Music on iTunes and Spotify
- Movies Netflix and iTunes
- Thousands of TV Choices On
- Satellite, YouTube, Amazon, etc.
- Expedia
- Google Maps
- Banking online

Yet buying life insurance hasn’t meaningfully changed in 30 years…

- Meet with an agent and answer pages of health and avocation questions.
- Meet with paramed - provide blood & urine sample and have your height & weight taken.
- Wait weeks to months for a decision on a product that may or may not meet your needs
Managing Change is Critical to Successful Growth

Issues to grow business effectively

- Accelerated Underwriting Models: 50%
- Adapt Existing Distribution: 40%
- Adapt to New Buyer Dynamics: 35%
- Adapt to Transaction Based Sales: 25%
- Product Innovation: 10%

NMG Survey 2015
Accelerated Underwriting
Goals and Considerations

- Penetrate Underserved Markets
  - A Distribution Challenge for Middle Market
  - Generationally Changing Expectations

- Underwriting Process Ideally Aligns
  - Faster travel time
  - More transactional

- Industry Focus Today
  - Predictive Analytics
  - Automated Rules Engines

- Need to Balance
  - Desired improvements in process
  - Protective value of underwriting
  - Cost savings
  - Retail rate that is sellable for market / approach
Most Companies Looking at Automation as Well

Life Insurers’ Current and Future Automation Plans in %

<table>
<thead>
<tr>
<th></th>
<th>Using</th>
<th>Plan to Use</th>
<th>Plan to Acquire</th>
<th>Assessing</th>
<th>No Plans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>31%</td>
<td>12%</td>
<td>4%</td>
<td>22%</td>
<td>6%</td>
</tr>
<tr>
<td>Large</td>
<td>50%</td>
<td>14%</td>
<td>4%</td>
<td>27%</td>
<td>5%</td>
</tr>
<tr>
<td>Medium</td>
<td>20%</td>
<td>23%</td>
<td>20%</td>
<td>37%</td>
<td>6%</td>
</tr>
<tr>
<td>Small</td>
<td>29%</td>
<td>17%</td>
<td>6%</td>
<td>42%</td>
<td>6%</td>
</tr>
</tbody>
</table>

NMG Survey 2015
What's Happening in the Market Today?
Defining Accelerated Underwriting

- Fluidless underwriting
- Issue ages up to 55 or 60
- Face amounts up to $500k or $1M
- Underwriting based on:
  - Self-reported height and weight
  - Family and personal history
  - 3rd Party Data (MVR, MIB, Rx and other predictive models)
- Applicants can earn best non-tobacco rates, not just residual standard
- Retail premiums consistent with fully underwritten product are offered
Predictive modeling is a targeted area of focus for the life insurance industry.

Hannover research indicates that it can provide significant benefit to risk selection and stratification for life insurance.

Hannover has worked with LexisNexis to develop solutions.

- Transunion is another vendor in this space.
LexisNexis (LN) has developed a predictive model that uses FCRA data to estimate relative mortality risk

- Model produces a score from 200-997 with low scores=higher mortality

Key attributes of model include:

- Public records (felony, criminal, derogatory records, court filings, etc.)
- Lifestyle (property ownership, home value, wealth index, professional licenses, etc.)
- Behavioral (credit, bankruptcies, foreclosure, eviction, motor vehicle record*, etc.)
- Not using consumer data (magazine subscriptions, credentials, etc.)

LN provided data so that we could validate the results of their model

Dataset

- Includes over 4.5 million records representing ‘P&C insurance shoppers’
  - LN appended FCRA data and calculated a mortality score for each record
- Initial records October 2006 followed through first half of 2013
  - More than 140,000 deaths
- Mortality analysed relative to US population mortality, then adjusted to baseline referent to reflect relative risk

*motor vehicle records not included in sample population reviewed
The high level results of the analysis on the predictive model score were as expected:

- Higher Scores = Lower Mortality

But we also wanted to understand those relationships at a more granular level to feel comfortable that the model wouldn’t “break down.”

The table below illustrates the exposure, % of exposure, observed deaths, and relative mortality for different score ranges:

<table>
<thead>
<tr>
<th>Predictive Model Score</th>
<th>Exposure Years</th>
<th>% of exposure</th>
<th>Observed Deaths</th>
<th>Relative Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>200-299</td>
<td>2,060,220</td>
<td>9.0%</td>
<td>15,532</td>
<td>199%</td>
</tr>
<tr>
<td>300-399</td>
<td>2,150,535</td>
<td>9.4%</td>
<td>15,347</td>
<td>147%</td>
</tr>
<tr>
<td>400-499</td>
<td>3,308,535</td>
<td>14.4%</td>
<td>28,285</td>
<td>118%</td>
</tr>
<tr>
<td>500-599</td>
<td>4,559,388</td>
<td>19.9%</td>
<td>38,088</td>
<td>98%</td>
</tr>
<tr>
<td>600-699</td>
<td>4,768,445</td>
<td>20.8%</td>
<td>27,725</td>
<td>81%</td>
</tr>
<tr>
<td>700-799</td>
<td>3,550,238</td>
<td>15.5%</td>
<td>11,892</td>
<td>66%</td>
</tr>
<tr>
<td>800-899</td>
<td>1,847,540</td>
<td>8.0%</td>
<td>3,099</td>
<td>52%</td>
</tr>
<tr>
<td>900-999</td>
<td>710,551</td>
<td>3.1%</td>
<td>617</td>
<td>43%</td>
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</tbody>
</table>
For example, we know that mortality and wealth tend to be inversely correlated.

Higher Wealth = Lower Mortality

But wealth is also correlated with smoker prevalence, obesity, etc...

... so we wanted to be able to see that the predictive model score “worked” even when controlling for wealth.

<table>
<thead>
<tr>
<th>Wealth Index</th>
<th>Exposure Years</th>
<th>% of exposure</th>
<th>Observed Deaths</th>
<th>Relative Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>420,505</td>
<td>1.8%</td>
<td>2,291</td>
<td>151%</td>
</tr>
<tr>
<td>2</td>
<td>1,279,506</td>
<td>5.6%</td>
<td>11,664</td>
<td>126%</td>
</tr>
<tr>
<td>3</td>
<td>3,503,437</td>
<td>15.3%</td>
<td>22,398</td>
<td>109%</td>
</tr>
<tr>
<td>4</td>
<td>3,867,085</td>
<td>16.8%</td>
<td>22,032</td>
<td>90%</td>
</tr>
<tr>
<td>5</td>
<td>2,755,533</td>
<td>12.0%</td>
<td>13,753</td>
<td>74%</td>
</tr>
<tr>
<td>6</td>
<td>684,466</td>
<td>3.0%</td>
<td>3,095</td>
<td>62%</td>
</tr>
<tr>
<td>Unknown</td>
<td>10,444,922</td>
<td>45.5%</td>
<td>65,352</td>
<td>107%</td>
</tr>
</tbody>
</table>
The predictive model score shows a strong relationship with mortality, even when holding wealth constant.
The shape of the curve is consistent by age group and gender, suggesting it does not break down at this level of granularity.
Predictive model score has predictive value even without using credit data
• So score w/o credit could be used in states where credit data not allowed for life UW
• Credit data provides additional predictive value to score (i.e., steeper slope)
### Predictive Modeling: Hannover Re/LexisNexis
#### Stratifying Risk

**A/E relative to 2008 VBT S&U table**

<table>
<thead>
<tr>
<th>PM Score Range</th>
<th>Total</th>
<th>All Risk Classes Excludes Declines</th>
<th>Preferred Plus &amp; Preferred</th>
<th>Standard Plus &amp; Standard</th>
<th>Tobacco</th>
<th>Declines</th>
</tr>
</thead>
<tbody>
<tr>
<td>200-299</td>
<td>219%</td>
<td>166%</td>
<td>138%</td>
<td>184%</td>
<td>171%</td>
<td>371%</td>
</tr>
<tr>
<td>300-399</td>
<td>142%</td>
<td>118%</td>
<td>105%</td>
<td>116%</td>
<td>144%</td>
<td>280%</td>
</tr>
<tr>
<td>400-499</td>
<td>107%</td>
<td>93%</td>
<td>77%</td>
<td>104%</td>
<td>107%</td>
<td>233%</td>
</tr>
<tr>
<td>500-599</td>
<td>89%</td>
<td>80%</td>
<td>67%</td>
<td>85%</td>
<td>98%</td>
<td>195%</td>
</tr>
<tr>
<td>600-699</td>
<td>75%</td>
<td>67%</td>
<td>57%</td>
<td>72%</td>
<td>86%</td>
<td>169%</td>
</tr>
<tr>
<td>700-799</td>
<td>71%</td>
<td>64%</td>
<td>55%</td>
<td>69%</td>
<td>78%</td>
<td>183%</td>
</tr>
<tr>
<td>800-899</td>
<td>65%</td>
<td>57%</td>
<td>46%</td>
<td>65%</td>
<td>73%</td>
<td>192%</td>
</tr>
<tr>
<td>900-997</td>
<td>57%</td>
<td>51%</td>
<td>45%</td>
<td>62%</td>
<td>26%</td>
<td>202%</td>
</tr>
<tr>
<td>Total</td>
<td>95%</td>
<td>82%</td>
<td>68%</td>
<td>86%</td>
<td>105%</td>
<td>229%</td>
</tr>
<tr>
<td># of deaths</td>
<td>11,983</td>
<td>9,326</td>
<td>3,161</td>
<td>4,346</td>
<td>1,1819</td>
<td>2,657</td>
</tr>
</tbody>
</table>

Risk stratification based mainly on medical info

Risk stratification based on non-medical info

# of deaths

11,983

9,326

3,161

4,346

1,1819

2,657
Results are consistent by duration suggesting the LN model provides insight into the level of ultimate mortality (vs. an impact that wears off over time).

Score Performance by Duration

*based on results from General Population data set
LexisNexis Predictive Model – Potential Applications

- Accelerated UW program
  - UW triage; identify “good risks” eligible for less UW
  - No paramed/fluids necessary for a subset of lower risk applicants

- Apply to all new business as additional underwriting tool

- Managing “incompletes”

- Help determine preferred risks in “non-med/SI” products

- Post-issue monitoring/benchmarking
Accelerated UW Program
Illustrative Process Diagram

Application

LexisNexis Risk Classifier

High Score
- 3rd Party Data
  - Make offer
  - No additional testing
  *Accelerated path limited by age and amount
  **Accelerated Underwriting**

Medium Score
- Full Underwriting

Low Score
- Order additional requirements
  - Or downgrade risk class(es)
  **Additional Underwriting**

Traditional Underwriting
Implementing an Accelerated Underwriting Program

- Economics to support retail product/pricing
  - LexisNexis model score thresholds can be set to support overall economics
    Mortality increase due to removing paramed/fluids, offset by value of LN score & UW expense savings
    Targeting a mortality increase of 5-10% that could be offset by the UW expense savings

- Risks associated with change
  - New approaches, anti-selection risk, etc.
  - Appreciate how low mortality actually is today

- Start Slow, Monitor Business, Adjust
  - Many dials to set and turn
  - Important to monitor data and adjust

<table>
<thead>
<tr>
<th>Issue Age</th>
<th>1 year</th>
<th>5 years</th>
<th>30 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>463%</td>
<td>92%</td>
<td>33%</td>
</tr>
<tr>
<td>35</td>
<td>358%</td>
<td>56%</td>
<td>13%</td>
</tr>
<tr>
<td>45</td>
<td>139%</td>
<td>24%</td>
<td>6%</td>
</tr>
<tr>
<td>55</td>
<td>50%</td>
<td>10%</td>
<td>3%</td>
</tr>
<tr>
<td>65</td>
<td>18%</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>
Accelerated Underwriting Monitoring

- Impacts of a new underwriting regime
  - Protective value removed
  - Underwriting value enhancements

- Improvements from LexisNexis Risk Score

- Final mortality assumption under new underwriting regime

- Ongoing monitoring is critical
  - Post-issue APS
  - Random Holdout Group