Emerging Underwriting Methodologies and their Impact on

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Contents

Executive Summary 4
Section 1: Introduction 6
Section 2: Methodology 7
    2.1 General Background 7
    2.2 Selection of Experts 7
    2.3 Delphi Process 8
Section 3: Results 9
    3.1 Current and emerging methodologies (including definitions) used by companies to underwrite policies that will have a material or meaningful impact on anticipated mortality 9
        3.1.1 Methods 9
        3.1.2 Efficacy of Accelerated Underwriting 14
        3.1.3 Percentage of applicants that will meet the necessary criteria to be accelerated 16
        3.1.4 Per....................rC /TT1 1 08 0 Td [(b)-1 (e a)3.3 (c)-B6.7 (i) 0.005 T (c)-0.7 (c)-l 16.907 (n)1 (g0.7 (c) 0.005 Tc 16.907 0 Tdu)1

Emerging Underwriting Methodologies and their Impact on Mortality Experience Delphi Study

Executive Summary

The Society of Actuaries ("SOA") Simplified Issue/Accelerated Underwriting & VM20 Practice Work Group ("Work Group"), established by the SOA Preferred Mortality Project Oversight Group ("PM POG"), conducted a study ("the Study") regarding underwriting methodologies and their impact on mortality experience using the Delphi Method, application, and Medical Information Bureau (MIB) data. As technologies evolve, other data elements will likely become increasingly important. A big one is Electronic Health Records (EHR), which may become vital as the availability and completeness of these improve. Reliability and quality of data sources is critical to being able to manage mortality within accelerated underwriting programs.

Mortality Deterioration – The quality of the program has a big impact on how mortality will compare with traditionally underwritten business. In an above-average program, we could expect the mortality to be less than 5% worse. In an average program, we could expect the mortality to be 5-10% worse. In a below-average program, we could expect it15.4 (t)0mortalityou

Section 1: Introduction

The Work Group carried out the main objectives of this project and engaged a consulting firm, Risk & Regulatory Consulting ("the Researchers"), to perform the research and develop this paper. The objectives of the Study, which included 33 experts from 16 life insurance companies, three consulting companies and six reinsurance companies, were to:

1. Identify and define the current and emerging methodologies used by companies to underwrite policies that will have a material or meaningful impact on anticipated mortality;
2. Categorize the above methodologies in a way that facilitates the measurement of their impact on anticipated mortality;
3. Estimate the impact of the categories of methodologies on estimated future mortality relative to standard industry experience tables; and
4. Using the estimated mortality impacts, summarize potential processes for choosing appropriate mortality assumptions under Principle-Based Reserves (PBR).

In order to reach these objectives, the Work Group utilized the Delphi method - a multi-round survey of experts interspersed with communication among the participants – to help draw conclusions regarding the objectives above. The responses of the panelists were confidential and, when shared with the other experts, names were not provided with the comments. The purpose of study was to provide practitioners with a framework that clarified how to categorize different underwriting methodologies, as well as determine what adjustments could be applied to the base mortality tables to estimate an expected mortality basis for each of the different underwriting methodologies. A desired outcome of the study was to help provide information that facilitates regulators' understanding of, and approval regarding, an individual company's assumption setting for the methodologies defined, and acceptable reserving adjustments.

Based on the results of the Study analysis, we have summarized the approach, information gathered and conclusions and shared the Study results with the Work Group and the PM POG for additional input and feedback. The summary includes a yng1 [(t)2.7 (h2.7o)-10.1 0.001 T71TJ 0.0048 (f)-37ondo.1e met (h)0.9 [(i)3.1 (a1 Tc 0.18i)3.1 (z)-4.6 (e)-1 (d)1 (t)2.7 (h)0.9

Section 2: Methodology

2.1 General Background

The Delphi technique is a method for obtaining consensus. It consists of a series of questionnaires that are developed and refined in sequential stages until agreement is reached. In most cases, consensus on every objective is not met and opinions will vary, providing different viewpoints on some objectives.

2.3

Algorithmic Underwriting

This method uses predictive models or algorithms to determine the underwriting risk class or to help the underwriters identify which specific parts of the underwriting file should require a manual underwriting review. This is similar to automating underwriting guidelines to assist the underwriter in making the right risk class decision and ensure the correct underwriting process, pathway, and requirements. A model (or, more likely, a rules engine) can explicitly define the risk class of an applicant when there is enough information to make such a decision.

Simplified Issue (SI)

Simplified issue removes certain underwriting requirements with the full expectation that mortality of the resulting sales will be worse and, therefore, the products are significantly more expensive due to higher expected mortality. SI has limited medical underwriting questions, low face amount coverage (typically $250,000 or less), and includes "loaded"

Electronic Data

Electronic data may be used to expedite the underwriting process, although the use of electronic data has not yet been achieved anywhere near its potential. Electronic data elements include use of medical billing data showing encounter information, inpatient drugs, and many lab values as well. There are vendors that offer electronic diagnostic test results from physicians, clinics and hospitals, including lab results and pathology results. Electronic Health Records (EHR) eliminate or reduce the need for medical exams by the insurer and provide a long-term historical view of a person's health, as opposed to a point-in-time view from an exam. However, EHR are not close to eliminating or materially reducing the need for medical exams as part of the underwriting process. This possibility is still years away. The EHR is most comparable to the APS, however, there is not enough evidence yet that the information in the EHR is of the same quality as that from an APS for insurance underwriting, nor whether it would place the applicant in the same underwriting risk class.

Electronic medical records are not yet a major factor in underwriting, but could emerge as one over time. The possibility of errors in the records exist due to incorrect coding, a doctor coding a specific diagnosis in order to receive reimbursement34(r)-3.2 (ac)2(f43(tA2 (i)-8.9)23.7 (fs)-5.4(r2)-0.9 7.7(c(a)3.1 (s)1 (g)-1.9 ( )495 (t)2.7 (5d0(e)-18(v)-B (v)-6.83(3)su-16 3.2 (ac)Tr8.9.5

Use of Fair Credit Reporting Act (FCRA) credit data and other consumer reporting agency data are newer sources. This information is used to develop a mortality risk score based on historical relationships between credit standing and mortality as part of the underwriting decision.

Additional tools are addressed throughout the report.

3.1.2 Efficacy of Accelerated Underwriting

Underwriting has always been an evolving discipline. The newer underwriting techniques are simply the next step in the evolution of underwriting practices. Any one of the underwriting methods described in Section 3.1.1 may or may not be effective. It depends on the business application, drivers of mortality performance for the company, and general company underwriting philosophy. The success in predicting mortality outcomes should be relative to some expectation.

The following question was asked of the panelists - Of the methods mentioned, which do you understand to have (i) greatest efficacy; (ii) least efficacy in predicting mortality outcomes? What programs or characteristics would

any actual or perceived discrimination. There are observable differences in rates by geographic region as well, which is likely correlated with higher rates of obesity or tobacco use.

- State demographics - States with higher rates of obesity and diabetes may provide lower rates of qualification. Companies should be careful about dropping down to MSA, zip code or Zip+4 level as it could create the perception (or reality) of disparate impact.
- Extent of disclosed medical conditions - D

3.1.4 Percentage of life insurance applications that will be submitted through accelerated underwriting instead of traditional underwriting (in 5 years and in 10 years)

According to the panelist responses, the percentage of applications that will be submitted through accelerated underwriting will be as follows:

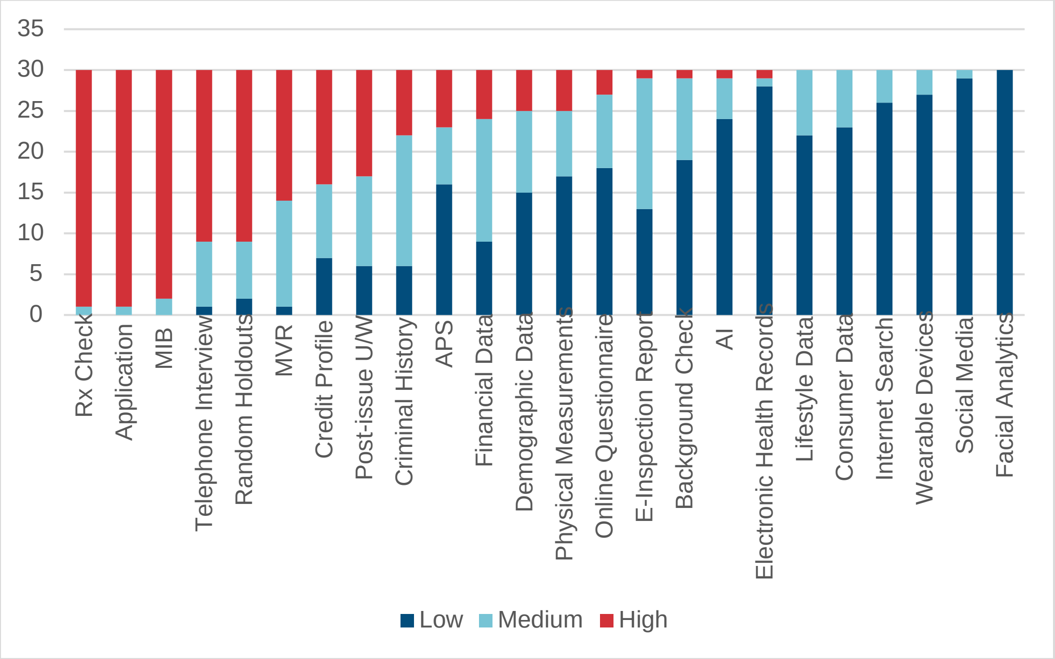
- In 5 years – minimum 20%, maximum 95%, average 57%
- In 10 years – minimum 40%, maximum 100%, average 79%

Accelerated underwriting is one pathway in life insurance underwriting, and not mutually exclusive from the traditional underwriting pathway where there are medical exams, fluids collected, and labs. For some applicants, the “traditional” pathway will continue to be the most prudent underwriting process. At some point, possibly between five and ten years from now, all applications will go through a process that helps decide if the case is qualified for accelerated underwriting or not at the time [illegible] underwriting may not be an appropriate substitute. Foreign nationals also create a risk. Although it is hard to predict what the maximum face amount for accelerated underwriting will

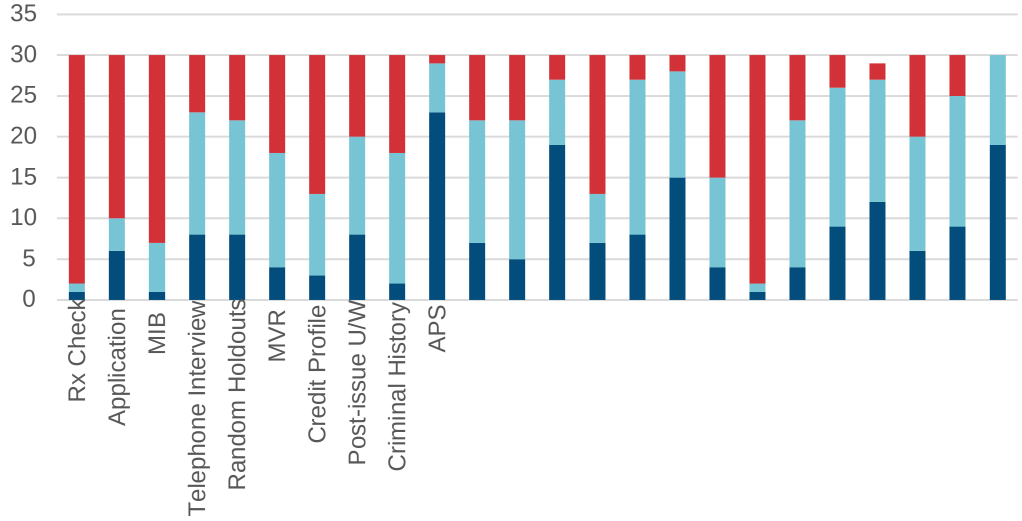
3.1.6 Data Elements

We asked panelists to state the importance of including the data elements shown below in an accelerated underwriting program. Artificial Intelligence (AI) was also included although it is not a data element, but an approach for evaluation. (Now and in 10 years)

Now:



In 10 years:



- Focuses on achieving cost savings and increased market share without investing in much new evidence and, as a result, suffers from significant increases in m Td ( )Tj -0.003-0.9 (w)-0.8 (i)ct(ac)2 , It is important to emphasize that predictive models are not a black box and can be explained. They may be very complex, however, so it may be a challenge to have proper oversight from regulators when non-parametric or machine-learning algorithms are used for making decisions. Even though the creators may be able to explain a model, for external audiences who struggle to understand, it is a *de facto* black box.

In a setting where accelerated underwriting is used to avoid collecting fluids, the data sources for items like nicotine use replace the application and or physical measurements. Misrepresentation rates for tobacco use can run as high

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be considered upfront, but still may not be able to be answered until there is some experience data from the program available for review.

- History of cancer
- High body mass index (BMI) - Weight will often be understated by applicants.
- Overaggressive programs
- Pricing risk, in particular Standard risks being classified as Preferred - This will happen in an AUW program, but it also happens in traditional underwriting programs. If it is monitored and action is taken when a general problem is found, this is a low to medium risk.
- Reputational risk, in particular if non-medical data sources such as credit based mortality risk scores are used to decline applicants. This is a low risk, but if it happens, it could have a high impact.
- IT risks including deployment, servicing, connectivity, and infrastructure.
- Operational risks driven by integration with underwriting systems and process changes. - The biggest issues are

Any accelerated program is likely to make a small number of poor underwriting decisions, both cases where a better

Another consideration is the impact if not-obviously-impaired young lives become more prominent in the mix of business because on paper they look great and, therefore, get accelerated. Then, the overall mortality will ultimately be much worse, but it also won't likely show up for 5-10 years, when it will be difficult to reverse the "damage" that was already done.

Consistency in underwriting doesn't improve mortality; it makes the same good or bad decisions across the board. The best of models will only improve mortality if they have all the information needed to make the proper assessment.

The increases in mortality are expected to wear off over time after the policy issue date. It is important to know what the impact of misclassifications of risk is by frequency and severity. Frequency is how often the predictive model gives a higher (healthier) risk score than traditional underwriting would have assigned to the same case. Severity is how significant the mortality understatement is when the model is "wrong." Frequency and severity of "misses" is one approach to evaluate the impact on mortality from AUW.

It may be that, i

Below are detailed comments from the panelists regarding grading:

Some panelists indicated that, to the extent there are traditional underwriting declines and rated risks that are getting accelerated underwriting offers of Standard or better, and depending on the underwriting tools used, the excess mortality likely won't grade into 100% of traditional underwriting mortality for many years from issue or very old attained ages. That being said, there will likely be some convergence over time such that after a period of time the excess will be pretty small.

Accelerated underwriting mortality will follow a different slope. One panelist indicated that it will grade into traditional underwriting mortality by duration, not attained age, and that convergence could be expected by duration 15 or 20. The biggest reason for mortality deterioration will be unhealthy lives with shorter life expectancies that get accepted into the accelerated program.

For those who believe that accelerated underwriting mortality will grade into traditional underwriting mortality, the expected timeframes are as follows:

- Minimum 0 years, maximum 50 years, average 14 years

Based on very limited data, one panelist had seen mortality for programs using primarily Rx data grade out over a minimum of 10 years. As Rx is a medical proxy, its impact should be approximately the timeframe of preferred wear-off under full underwriting. Other attributes, such as credit, appear to be more "durable" than the medical proxies, resulting in a longer grading period.

It really depends on the program specifics and how ultimate mortality is defined. There is a difference between substandard and preferred mortality for many durations so, to the extent there are substandard risks now "

There are emerging triage tools, such as smoker prediction models, that may help offset this effect by redirecting the high likelihood smoker applicants to the traditional route. This is often caught if the applicant is being treated with medication, or if they have seen doctors for a specific issue. Companies should be very transparent that they are doing post-issue audits to reduce the extent to which applicants hide adverse conditions. One panelist noted they were doing audits on 20% of the cases at this time and would rescind the policy based on fraudulent responses if necessary. This 20% seemed high to some panelists, however, it could be seen as necessary depending on market or risk tolerance of the carrier. Typically, carriers are targeting approximately 10% for random holdouts and/or audits.

Agent monitoring can also help to deter bad behavior by producers.

One panelist also pointed out that using a tied tele-interview would also help with anti-selection

- Cases that are accepted into accelerated underwriting, but should have been declined, substandard or tobacco, are of most interest. Another measure is how many risk classes off a case is (for example, cases that went up one underwriting class are less concerning than those that went up two or three)
- Provides expected mortality impact estimates based on difference in risk class placements
- Even a small number of cases can be used to review criteria, identify obvious gaps, and give a preliminary view of the program, so it should be monitored on an ongoing basis

Post-issue monitoring

- The carrier reevaluates the risk for policyholders who were approved through AUW subsequent to policy issue
- Its value depends on the extent to which APSs for applicants can be collected, how many applications a company writes in the AUW program, and the eligible age and face amount ranges used. A carrier would likely need at least 50 APSs to start seeing any real trends
-

- Early lapse rates, which may be an indicator of “churning” (deliberate policy replacements by agents) or bad sales practices arising from the simplified process
-

but captive agents do not have the ability to select between companies with different underwriting processes. If all accelerated programs had instant offer, then an applicant could very quickly apply for several places and essentially "spreadsheet" offers and select the lowest price.

Spreadsheeting will continue to be an issue, although it may take distributors a while to figure out when to send cases to each company based on price and speed to issue. It should not be that easy to predict the model answers unless there are obvious holes in it, which can and should be stopped by prompt action.

Distribution channels that do a lot of price shopping could result in companies oftentimes only winning cases when they make a mistake. Distribution channels that are focused more on the simplified issue market may try to see if they can get their applicants to qualify for accelerated underwriting in order to have access to lower retail rates, which could pollute the accelerated underwriting risk pool. Agents would run the risk of getting declined coverage from an accelerated underwriting program, and then be unable to sell the simplified issue product.

Channels where shopping price or "coaching" answers on applications is common, mortality results could worsen prescription history rechecks, and post-issue APS audits. A random holdout program is also recommended. The value of these depends on what requirements were included in the automated process. As long as automation brings usable data, it will provide support to the mortality assumption setting.

One panelist pointed out that automation might actually have an inverse effect on confidence until enough actual experience was gathered and studied in order to correctly program the automation.

Any change in “confidence” is relative to a baseline expectation of human underwriters. If there is high variability in underwriter decisions, with many exceptions, then automating the process would reduce that variability and should breed better overall results.

Automation increases the consistency of underwriting decisions, and can more efficiently synthesize all the data that is available on the applicant. Decisions would be made with greater consistency and rules could be written that are far more complex than could be remembered and implemented with human underwriters. However, rules, no matter how complex, don’t have the ability to see the grey in cases that highly experienced underwriters bring to the tabl.8 (n)0.9 4 (n)0.d [(r)-

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1ahiaustlu1 (e)-1 (u)0.5 (c)29.7 (e)1.9 (r)-5.4 (e)-1 (f)-3.23(r)

Since accelerated underwriting is relatively new to the industry, companies want to adhere to the established guidelines to start so they can clearly measure and remain close to the priced for mortality. That being said, there are some one-off situations.

Traditional underwriting programs allow for some amount of flexibility versus a carrier’s published guidelines, but this flexibility is often defined by the carrier’s underwriting manual. Similar flexibility can be programmed into an automated rules engine. Additionally, a statistical algorithm calibrated to past underwriting decisions will inherently attempt to recreate this flexibility in its parameters.

The mortality impact is driven by the frequency and severity of the exceptions and whether they are expected or unexpected. For example, if there are pre-defined “stretch criteria,” then that can be factored into the mortality expectation.

There are accelerated underwriting analysts that review borderline cases, but not for the purpose of allowing exceptions. The transparency and consistency of how the underlying model is used to waive underwriting requirements is critical to regulators. As an example, imagine that a predictive model was force ranking applicants into a percentile score from 0-100 based on how healthy the model bu i9 (y)-5t oltss,(h)0.9 o51eah1herappticantsbo wb0.9 (e)-13 (l)3 (

3.3 Estimates of the impact of the categories of methodologies on estimated future mortality relative to standard industry experience tables

3.3.1 Industry tables as a starting point

Panelists provided views on the extent to which mortality expectations should be based on industry tables as a starting point.

Summarized Panelist Responses

One view was that current industry tables were built from data that relied on traditional underwriting requirements and traditional agent/client engagement models. Both of those are changing signiftd10.1 (410.1 (41e0.9 (e)-1 (l)-)1.9 ((.)32t)2.7 (B/-2.

whether anything more than a flat percent load is needed. However, this analysis is needed at a more granular level than the class in aggregate, specifically by traditional experience study variables like age, amount, and sex.

The VM-20 (Life Principle-Based Reserves) structure gives the actuary the ability to choose from a limited set of industry tables that correspond to the expected mortality of any given class or subdivision of a mortality segment. fke Over time, for VM-20 purposesd [g33 (t) 0.018 T(0 Td 5 (l)-8.9/Dv)]TJ(p)-11.me

3.4 Using the estimated mortality impacts, summarize processes for choosing an appropriate mortality assumptions under Principle-Based Reserves (PBR)

3.4.1 Best Estimate M

Section 4: Concluding Remarks

Underwriting is evolving with newer underwriting techniques that are reaching more potential applicants. How well these practices are implemented, and the quality of data sources used, will go a long way to providing predictable mortality outcomes. The quality of many currently available data sources is good and will only improve with time.

For the companies surveyed, accelerated underwriting appears to be leading the charge in today's current state of underwriting. Traditional underwriting will still have its place for applicants who are not triaged into an accelerated underwriting process. Most companies' goal is to maintain similar mortality outcomes and pricing with what is offered today. The implementation practices of the company programs will definitely have an impact on the mortality levels relative to traditional underwriting. As discussed earlier, an above-average program may exhibit mortality similar to that of traditional underwriting. A below-average program will most likely exhibit higher mortality with a flatter slope, shorter select period

Section 5: Expert Panelists

Special thanks go out to those who took the considerable time and effort required to provide thoughtful and detail-oriented responses to all three rounds of questions. The following are the names of the panen

Section 6: Acknowledgements

The authors' deepest gratitude goes out to those without whose efforts this project could not have come to fruition: SOA Simplified Issue/Accelerated Underwriting & VM20 Practice Work Group and others for their diligent work

AppendixA: Questionnaires

Rounds 1 and 2

1. What are the current and emerging methodologies used by companies to underwrite policies that involve a faster or simpler process, or use alternative sources of data? Please provide as many different methodologies as you can, with definitions of each.

2.

19. Will automation used in accelerated underwriting add more confidence to mortality decisions? What post issue actions or risk mitigation techniques are used with automated processes and what is their efficacy/value?

20. What is the approach you would use to determine a best estimate mortality assumption for business that was subject to accelerated underwriting? We are focusing on methodology and not the actual assumption.

21. What is the process you would take to determine the mortality assumption under Principle-Based Reserves (PBR) for business subject to accelerated underwriting?

Round 3

1. Of the data elements listed below, state the importance of inclusion in an accelerated underwriting program. (Now and in 10 years)

	Now	10 years

3.

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Objectivity: The SOA's research informs and provides analysis that can be relied upon by other individuals or organizations involved in public policy discussions. The SOA does not take advocacy po(l)3.1 (in)0.9 1 2 (e)-13 (1 (i)3.1 (z)T2.3 (y)-t)2.-1