



Emerging Underwriting Methodologies and their Impact on Mortality Experience Delphi Study





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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, which involves surveying experts in the topic, sharing anonymous survey results with those experts, and allowing revisions and refinements to responses to obtain greater convergence of views among the participants. The experts answer questionnaires in two or more rounds and, in the case of this Study, three rounds were used.

A summary of the key findings follows. These key findings represent common themes expressed by many survey participants. Where numerical values were provided, these findings represent average responses.

Types of Underwriting Techniques – Many of the emerging techniques to underwrite life insurance policies could be applied to different methods of underwriting such as traditional, accelerated and simplified issue. Most of the newer techniques revolve around waiving fluids by using additional data sources that allow companies to accelerate the underwriting process for a certain percentage of applicants.

Qualification Percentage Variability – The percentage of applicants that qualify for accelerated underwriting will vary from company to company depending on the program’s target market, eligibility and qualification criteria. Most of the panelists indicated potential for these qualification percentages to increase rapidly.

Evolution of Underwriting – Underwriting has always been an evolving discipline. The newer underwriting techniques are simply the next step in the evolution of underwriting practices. The question isn’t a general one of how well statistical algorithms or underwriting rules engines are able to predict mortality outcomes, but how well a specific implementation is at predicting mortality outcomes.

Qualification Percentage Impact on Mortality – The qualifying percentage can impact the expected mortality, with higher qualifying percentages (i.e., being less selective) increasing the mortality associated with accelerated underwriting; however, this is not always the case. Survey participants believe that, in ten years, we may see a higher percent of applicants being accelerated, with possibly similar mortality, in a well-designed program.

Accelerated vs. Traditional Underwriting – There are certainly situations where accelerated underwriting is a poor substitute for traditional underwriting. Today, some of these situations are for the older-aged applicants and applicants with an unusual medical history.

Data Elements – In today’s underwriting environment, there are certain data elements that many of the survey participants consider a must in an accelerated underwriting program. These include prescription drug use (Rx check),

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 mortality to be above 10% worse.

Substandard Risk – One of the biggest risks is accepting substandard applicants who would have been excluded in a traditional program. For example, this could include accepting 3, 5, and 10% of risks as substandard in above-average, average, and below-average programs, respectively. The mortality for these risks could be around 380% higher than the non-substandard business.

Sentinel Effect and Errors – There is a loss of the sentinel effect (i.e., the tendency for human performance to improve when participants are aware that their behavior is being evaluated) that exists in traditional underwriting, but there are offsetting factors. There may very well be more anti-selection, especially with tobacco usage. The offsetting factors are the inclusion of nonmedical information not previously secured in traditional underwriting, and certainly a reduction in underwriting requirement costs. The addition of other tools, such as prescription histories, non-medical credit and lifestyle models used to predict mortality, can offset this some, as can a random holdout (deliberate full underwriting of a case that qualifies for accelerated) and/or a post-issue Attending Physician Statement (APS) auditing program.

Applicable Experience – Using industry tables based on fully underwritten mortality experience is probably a reasonable starting point when developing a mortality assumption for accelerated underwritten policies, although the slope and length of the select period might need adjustment depending on the quality of the program. Most accelerated underwriting processes are simply trying to set parameters to predict the traditional underwriting decisions and risk classes. In an above-average program, we would expect that the slope and length of the select period might be similar to traditional underwriting business. However, in a poorly designed program, they could be quite different.

Impact on PBR – For Principle-Based Reserves (PBR), challenge in setting mortality assumptions is the accelerated underwriting programs are all different and few companies have robust, credible data. A couple of approaches are detailed in this report that could potentially be used despite the challenges. There are several suggested approaches regarding how to demonstrate a revised mortality expectation to regulators, which involves sophisticated modeling, new approaches for experience studies and mortality analysis, and use of predictive data elements to make adjustments to mortality.

Outlook of Accelerated Underwriting – Accelerated underwriting appears to be leading the charge in today's current state of underwriting for many companies surveyed for business that would have traditionally been fully underwritten. For some applicants, the "traditional" pathway will continue to be the most prudent underwriting process when a company's goal is to maintain similar mortality outcomes and pricing to what is offered today. Data quality concerns could be a major sticking point for regulators and needs to be a priority for those developing the programs. In the long run, automation will add confidence. Refining underlying rules, along with knowledge gained from experience, could improve underwriting decisions and overall mortality. The quality of many currently available data sources is good and will only improve with time.

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 information that is responsive to each of the objectives outlined above.

This document presents the methodological approach applied in the Study and the main results of the Delphi process obtained from the study. Results are summarized from the research conducted and do not represent the views or opinions of the Researchers, the Work Group, or the PM POG.

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. In this project, we took advantage of one of the strengths of the method, which is the ability to gather opinions from experts from different backgrounds, obtaining a diverse range of opinions, in this case, for providing information related to accelerated underwriting.

The Study consisted of three rounds of questionnaires. The first round involved having the panel answer all of the questions individually and collecting their responses. The responses from the first round were consolidated. We then asked a second round of questions that included summarized results from the first round, including the rationale(s) for the responses. The goal of this methodology is to develop a more convergent view, one in which the panel of experts will benefit in the second round from seeing the range of judgments and rationale of the other panelists. For example, in the first round, some experts expressed a view that the mortality under an accelerated underwriting program is highly dependent on the number and quality of data elements used. If this view, and its rationale, are shared with the panel prior to the second round, additional experts may also concur with that view.

2.2 Selection of Experts

The expert panelists who participated in the Study were identified by the Work Group and the Researchers who carried out the study. They were experts in the area of accelerated underwriting or related fields, such as mortality experience studies or determination of mortality assumptions for valuation purposes. Online research was conducted on accelerated underwriting and its potential impact on mortality to identify an additional set of experts (for example, authors of papers or presentations on the topic were identified as potential participants). Experts who the Researchers contacted also recommended other potential panelists to participate in this study. However, the ultimate set of panelists were not made aware of who else was participating, in order to retain the independence of individual responses.

Our selected panel of experts consists of panelists with some or all of the following characteristics:

- Technical underwriting background (including simple, accelerated, and full underwriting techniques)
- Technical understanding of predictive analytics
- Technical mortality experience analysis background
- Strong analytical skills
- Understanding of mortality assumption setting
- Understanding of credibility theory
- Understanding of life insurer operations
- Understanding of risk classification
- Understanding of Principle-Based Reserving

As mentioned before, the role of the panelists was to answer a series of questionnaires. All of the questionnaire responses were evaluated by the Researchers and the Work Group. The panelists provided their opinions in their responses to the questions, which were used to characterize emerging underwriting methodologies.

Questionnaires were sent to the panelists by e-mail. During every round of the Delphi process, the number and quality of the answers were monitored. Reminders were sent out in order to promote full participation.

2.3 Delphi Process

The Delphi process involved three rounds of questionnaires and was carried out in the following seven stages:

1. Development and circulation of the first-round questionnaire (completed in September 2017)
2. Analysis of first-round responses (completed in December 2017)
3. Development and circulation of the second-round questionnaire (completed in January 2018)
4. Analysis of second-round responses (completed in February 2018)
5. Development and circulation of the third-round questionnaire (completed in March 2018)
6. Analysis of third-round responses (completed in April 2018)
7. Development of this research report (completed in July 2018)

For the first round, the questionnaire was sent to the expert panelists with directions on how to complete it. The responses were collected, reviewed, consolidated, and summarized.

For the second round, the summarized responses from the first round were sent to the panelists along with follow-up questions developed based on the first-round responses. In some cases, additional questions were added based on identification of missing elements from the responses in the first round and, in other cases, additional questions were added to improve the clarity of the first-round responses. With respect to the summarized responses from the first round, the panelists were asked to state which responses they considered to be highly accurate responses with which they agreed and to identify less accurate responses where they did not necessarily agree. They also were instructed to state whether their views had changed from their first-round response. Finally, they were given the opportunity to provide additional comments with respect to accelerated underwriting methods. The responses were reviewed, consolidated, and summarized.

For the third round, a subset of the questions and responses were sent out in order to attempt to achieve consensus on previous responses. Questions for which the Researchers and Work Group identified a consensus view through the first two rounds were not included in the third round. The Researchers also constructed and distributed an additional separate questionnaire with questions designed to obtain specific targeted information such as the mortality impact for an above-average, average, and below-average designed accelerated underwriting program. The responses were reviewed, consolidated, and summarized.

Section 3 of this report is constructed directly from the survey responses and is comprised of both specific panelist responses and summaries of the responses when multiple panelists responded in a similar way. The beginning of each section includes a brief summary or analysis of the topic being covered or the question that was asked, and is then followed by panelists' comments, indicating when it was an individual panelist comment only.

Section 3: Results

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

Several of the questions were developed to aid the Researchers and Work Group in understanding the range of methods used in underwriting, how those methods are defined, and the extent to which variation in the methods would impact anticipated mortality of the insureds. This was achieved through initial questions asking about the methods in general and how they are defined, followed by a series of more detailed questions to gain further understanding about how extensive the various methods are, their implications on classification of risk, variations in distribution methods, views on the effectiveness of the methods, risks associated with various methods, the specific data elements analyzed, and views on how the various methods are expected to impact future mortality, both in the shorter and longer term.

3.1.1 Methods

The panelists were asked what current and emerging methodologies were used by companies to underwrite policies that involve a faster or simpler process, or use alternative sources of data. They were to provide as many different methodologies as they could, with definitions of each. The results are summarized below.

Summarized Panelist Responses

Underwriting methodologies cover the spectrum from collecting a higher degree of information, sometimes with a lower price for the policy, to collecting a lower degree of information, sometimes with a higher price for the policy. A high-level overview of this spectrum, ranging from highest degree of information to lowest, is as follows (actual definitions will vary from company to company):

- Traditional Underwriting – This typically involves the collection of fluids (blood, urine, and saliva), the Attending Physician Statement (APS), a long-form application, and relatively extensive medical information.
- Accelerated Underwriting – This typically involves a reduction in the requirements of traditional underwriting if certain minimum demographic or health-related requirements are met by the applicant. The premise for accelerated underwriting is that alternative approaches and data can be used to segregate applicants by risk, and those with a lower risk can be underwritten with a lesser amount of medical information. As a result, the price may be higher than under the traditional approach, but many programs are designed to enable similar pricing using alternative approaches and data.
- Simplified Underwriting – This is also called simplified issue (SI), and typically involves a limited approach to underwriting, for example use of information only, without the collection of fluids. The assumption is that mortality will, therefore, be higher, and the price reflects that mortality.

Below are some areas in which accelerated underwriting differs from simplified underwriting:

- Accelerated underwriting uses data and predictive analytics to determine whether certain underwriting elements, such as collection of fluids, are worth the additional cost. This allows the company to offer a price that is competitive with traditionally underwritten policies, and often more quickly.
- Accelerated underwriting usually implies that a full medical history is obtained. A full set of medical questions are always asked; these are typically not waived for accelerated underwriting.
- SI underwriting decisions are made with very limited information and with fewer questions of the applicant.
- The SI mortality expectation is considerably higher than that of traditional or accelerated underwriting.
- SI pricing is higher to reflect the risk assumed when requiring less underwriting evidence.
- SI application acceptance rates are high, typically between 70% and 90%. Preferred classes, if any, are typically limited to just one Preferred Non-tobacco (NT) class. Generally, there is no risk classification beyond age, gender, and possibly smoker status.

The expert panelist responses provided the following additional definitions regarding underwriting methods, most of which are approaches that fall into the accelerated underwriting category in some form, since they are designed to reduce the time period, or the amount of data needed to perform underwriting:

Triage

Triage applies rules or algorithms that distinguish applications eligible for automated approval from those requiring either limited intervention from an underwriting assistant or traditional underwriting by an underwriter.

Depending on the applicant's initial risk profile, applicants may be sent through different underwriting experiences (i.e., applicants are required to complete different underwriting requirements based on initial risk profile, versus just age and policy face amount). Triage can involve automated processes, or applications could still be processed manually (by an underwriter). It is the process of evaluation of the presented risk and the identification of the path that a particular applicant/application will go through in underwriting. Those paths include fluidless (no blood, urine, or saliva) and automated approaches today, but will likely take other forms in the near and distant future.

The triage process will guide the next steps in underwriting to achieve a faster, more efficient underwriting process. The next step may be to directly issue a policy, or it can define the next step or requirement (i.e., obtain labs, Attending Physician Statement (APS), or other requirements). An alternate step might also be to decline an applicant based on adverse information provided by the applicant.

Accelerated Underwriting

Accelerated Underwriting (AUW) for most companies attempts to maintain comparable mortality as traditional underwriting while speeding the underwriting process by replacing slow and invasive underwriting techniques with new data sources and data science techniques.

The goal of accelerated underwriting programs is to identify those healthy applicants for whom obtaining traditional medical requirements such as paramedical and labs are likely to provide no incremental value in the underwriting decision process.

This methodology may use existing applications, products, and pricing to triage some applicants to an underwriting decision without lab results and exams, while minimizing increased mortality expectations and the corresponding pricing impact.

One panelist noted the structure of the accelerated underwriting programs vary by company and, for some, the variance between the expected mortality under AUW and traditional underwriting can be significant.

The rapid innovation in AUW techniques may improve mortality expectations. It is also expected that the customer experience will improve over time.

Predictive Analytics

Predictive analytics utilizes multiple variables in a model to help make predictions.

Consumer marketing companies and a number of biotech firms offer data that could be used to assess risk or determine final underwriting requirements; however, consumer marketing data is often sparse and not completely accurate and, therefore, it may not be advisable to use it for developing an industry standard for underwriting models. Many companies are using some sort of predictive modeling to help segment policies into risk classes and reduce the medical information requirements needed in traditional underwriting. Predictive models are mostly developed and maintained internally by data science teams; but some companies may also evaluate and possibly purchase marketing data.

Predictive models can use a carrier's existing customer experience data to develop a model that assigns risk scores to each new applicant based on their characteristics (demographic, financial, health-related). The risk scoring then facilitates the determination of an underwriting class.

The types of predictive models include:

- Requirement determination predictive models - These models are targeted to gauge whether a specific underwriting requirement is needed for an individual (i.e., blood, APS, prescription check). Rules govern how results from these requirements converge to form an underwriting decision.
- Client condition predictive models – Conditions may include such things as smoking, disease states, and risky avocations. These models usually support a more extensive risk classification model, but could be utilized in conjunction with a set of underwriting rules to determine the ultimate underwriting class.
- Best class predictive models – These models can be used to stratify the applicants into higher-level buckets (e.g., best class, decline, and everything else), to some degree, and vary the more traditional underwriting approaches based on that high-level stratification. This allows for better overall performance.
- Multi-classification predictive models – These models attempt to directly predict the rating class amongst those allowed (usually excluding substandard).
- Mortality predictive model – These models are designed to predict the mortality of the applicant. These allow for a complete re-build of the risk classification structure based on model results, and result in highly distinct mortality classifications amongst applicants.

These models can be combined or used on a standalone basis. In addition, there are predictive models being used that select the applicants to market to, predict the applicants who are most likely to purchase insurance, and identify the applicants who are most likely to lapse.

The model is only as good as the data upon which it is built and, thus, is oftentimes supplemented by rules to account for low-frequency, high-severity conditions that tend to have sparse data.

An overview of how predictive models develop applicant risk scores is described below:

- The underlying data is used to develop a set of variables, which are indicative of better or worse mortality, and a set of associated risk scores (for example, high scores indicate high mortality risk and vice versa).
- Scores typically reflect actual mortality of a representative, or “calibration,” population.
- Scores can take the form of the actual relative mortality risk (also called “hazard values”) or represent a mapped structure based on hazard values (for example, the scores are mapped to values between x and y, with x being the lowest mortality risk and y being the highest).
- Scores are typically built using statistical models that consider interaction between the included variables.
- Scores will show different outcome patterns when applied against target populations that differ from the calibration population.
- Scores typically do not reflect low-incidence conditions (such as a rare disease or rateable occupational hazard) well due to the limited historical data available; they are often not nimble and may overestimate the very high-risk scenarios.
- Scores only can reflect the available inputs.

The models are typically designed to allow a certain percentage of applicants to qualify to have their traditional underwriting requirements waived, based on each individual company’s targets.

Artificial Intelligence (AI)/Cognitive Computing

This method uses machines that mimic human cognitive functions, such as learning and problem solving, and attempt to simulate a human’s (in this case underwriter’s) thought process. This is the ‘goal,’ but it does not appear there is any existing system that can do this at the present time. That said, artificial intelligence can play a role in the underwriting process.

Facial recognition is software that can efficiently help confirm answers to questions, such as what an applicant’s Body Mass Index (BMI) or smoking status is. This could also include advanced wearable devices that provide medical information through data collection, such as resting heart rate and activity levels. Most companies feel that significant changes are required in order to use this method reliably at this point in time.

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” mortality without preferred classifications. An underwriting engine or human underwriter can be used for risk assessment. SI uses nonmedical underwriting on all applicants versus accelerated underwriting, where only a subset of the applicants is issued a policy without exams/fluids. A medical or paramedical exam is not required for simplified issue.

Fewer application questions, less use of external data, and limited underwriting classes were common in simplified issue products of the past, but that trend is changing. The underwriting process for “modern” SI products is more robust.

Rules Engines

Rules engines utilize detailed sets of rules to automatically determine risk classification and, in some circumstances, the final rating for establishing the price to be charged. Rules engines can be simple, but also can be very complex, to the point of digitizing nearly all underwriting standards and coding their utilization if the supporting data can be collected. The set of rules permits automated policy approval and the issue of some percentage of policies without the intervention of a human underwriter.

Other features of rules engines include the following:

- Based on specified rules, typically including “knock-out” (decline) criteria and qualification ranges for the various underwriting classes.
- Recognize possible interaction among parameters, which may be less precise compared to model approaches.
- Often have many data points available, but typically only uses a select few to influence the selection decision. However, all data points are still assessed, just as if an actual underwriter reviewed a new application. These rules can be very sophisticated.
- Often complex to update regularly. The industry's experience to date has been quite mixed regarding ease of changes to the rules engines.
- Frequently based on robust, long-term, validated mortality experience by underwriting class (but not necessarily by selection parameter).
- Computer systems that are programmed to interpret digital underwriting requirements.
- Allow for automated review and decision making of increasingly complex underwriting cases.
- Some cases are beyond the scope of the rules engine and are referred to the underwriter.

Rules engines, if built properly, may be the most accurate way of recreating traditional underwriting decisions. However, developing a complete rule set that properly accounts for interactions among risk factors is a complex undertaking. The input data comes from a wide variety of sources and is not typically in a digital format. This makes fully automated underwriting using a rules engine very difficult. However, if this can be implemented correctly, it could be the most accurate solution to replace or improve upon traditional underwriting. However, rules engines are not likely to include variables that show up in low-frequency, high-severity situations. For this reason, it may never perfectly reproduce underwriting decisions.

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 reimbursement, and/or the patient persuading the doctor to record an alternate (more favorable) code. Also, the lack of old medical history on EHR can be an issue.

In addition, electronic inspection reports (EIR) and identity verification tools exist. These reports and tools contain or search for information such as social security number, bankruptcy status, tax liens and judgments, national criminal tips and leads, home prices, credit scores, sex offender listings, vehicle registration, driver license information, property ownership, professional licenses, Federal Aviation Administration licenses, county felony convictions and business information related to the applicant. The information listed here can be collected by the insurance company or through a vendor.

Use of a digital customer experience is uncommon but increasing in popularity. Allowing a consumer to apply using online tools and receive an instant decision requires the right questions both with respect to the number of questions and wording of the questions. Important features required in order to collect appropriate data and return, and automate an underwriting decision within seconds, include: robust identification verification, safeguards against anti-selection, and the utilization of as much data as possible. Because this process does not involve live interaction with the applicant, use of a personal history interview remains an important staple of accelerated underwriting programs.

Tele-Underwriting

Tele-underwriting is the process of calling an applicant on the phone to collect underwriting data. This can be performed internally by someone employed by the insurance company, or using an external vendor. This is performed by someone with medical and customer service knowledge and capabilities. The call can be to verify the answers from the application or to obtain further medical information. If the latter, there are usually "drill-down" questions, which depend on the initial answer to a medical question or other key underwriting question (i.e., avocations).

Other Tools/Data

There are other tools and data that are utilized in accelerated underwriting, which were not described in full detail above.

Using medical records from the Attending Physician's Statement (APS) is an option, but the tradeoff is that the time to approval or issue may be longer given the time span between ordering the APS, receiving the documents from possibly multiple health care providers, and then reviewing the APS(s). The process is not faster, but can still be viewed as simpler and non-invasive given that insurance medical exams and lab tests may be waived.

Medical Information Bureau (MIB), Motor Vehicle Report (MVR), and Prescription (Rx) histories are not necessarily new sources of data, but automating these data feeds is relatively new. Some of these have been in use for over a decade. One of the newer features seen in some programs is incorporating the information from these third-party data sources into the reflexive drill-down questions asked of the applicant. For example, if an applicant answers "no" to an application question about "do you have diabetes," but the Rx history indicates the applicant is taking drugs typically used to treat diabetes, the applicant is asked to explain the inconsistency as part of the drill-down questions.

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 distinguish accelerated underwriting from more traditional programs (traditional full underwriting or simplified issue)?

Summarized Panelist Responses

The question is not how well statistical algorithms or underwriting rules engines are able to predict mortality outcomes, but how well a specific implementation performs at predicting mortality outcomes. You can have a sound algorithm, engine, or model that appears to perform well based on the data used for calibration, but success is determined when the full end-to-end implementation accurately predicts the mortality upon which it was priced (to meet profitability metrics), while achieving or beating volume targets.

Assuming that accurate data, scores, and questions are gathered, and the rules are created appropriately, two important issues are human intervention and making exceptions to the rules. The consistent application of rules is an important aspect in predicting mortality.

In general, most of the panelists agreed that:

- Accelerated underwriting appears to be a leading trend in today's current state of underwriting.
- Predictive analytics has the potential to be very impactful, as does AI; however, current challenges include data availability and accuracy for many carriers. Thus, at this time, some predictive analytics and AI methodologies are not as effective as they ultimately will be. They do have large potential once these challenges are overcome.

Not all predictive models have proven to be superior to traditional underwriting and the rules used by traditional underwriting. A model can be limited based on the data available to populate that model. The combination of a model used in conjunction with underwriting rules often provides the most accurate risk assessment in an AUW approach.

All of the data items mentioned above provide valuable information for the decision-making process. There could be overlap between some (e.g., Rx and MIB), but they also can provide unique information to help the company make a decision. For some applicants, one or more of these may provide the underwriting information needed, while for another applicant, another avenue may provide the information needed. Typically, the more information available to make a decision, the more informed the decision can be; however, companies also have to be concerned with customer experience, costs, process efficiency, etc. It is possible to have too much data. Ideally, an underwriting decision requires just the appropriate amount of data for a given applicant in the proper format.

Specific data elements have varying degrees of efficacy. Some specific benefits and challenges associated with use of specific elements are as follows:

- Regarding Rx data, these deliver detailed prescription histories to underwriters electronically. Insurers can use this information to uncover critical medical information about the applicant that can be gleaned from their past prescriptions, and which may be missing from their responses to medical questions on the application. Rx histories tend to be available on only 75-80% of the applicants.
- Numerous carriers have conducted retrospective studies that demonstrate credit-based scores are highly correlated with mortality; however, credit bases are not well-correlated with traditional preferred risk classes. Credit data is capturing a new dimension of mortality, likely related to an individual's personality and risk behavior.
- Consumer marketing data may or may not be useful. For example, household information may or may not apply to the individual applicant.
- APSs still provide protective value in underwriting, however, using the APS is an obstacle to obtaining much more "instant" underwriting decisions since it takes time to obtain. This also highlights the importance to the industry of determining a good solution to utilizing Electronic Medical Records. Also, APSs may not be as protective at the younger issue ages that have less medical history built up. In addition, smoking status, as well as other insurance labs, may not be available within APSs. The value of the APS depends on the specific situation as to whether it provides the most protective value. Even an applicant's personal doctor may not have all of the relevant medical information on an applicant, while, for example, MIB or Rx data may disclose an issue the applicant did not share with their primary care physician. Generally, an APS provides important, and possibly the most valuable, information, but this is not always true.
- Facial recognition, which is a promising technology, is not yet in widespread use in production. With facial recognition, in some circumstances, it may provide information you cannot obtain elsewhere, and in other circumstances, it may not provide any information or may even provide false information.
- Other data elements with currently low efficacy include: voice recognition technology, social media checks, and data from wearable devices. While some of these may have lower efficacy than other tools, some can provide very valuable information that cannot be obtained elsewhere. Although these may not be effective today, and may not be for everyone, they will improve and, for some segment of the population, they may be more valuable. The level of efficacy may be less relevant than the fact that the more data that can be collected on an individual, the more comfortable the company is about an underwriting decision.

All of these items play a role in covering specific risks. More traditional programs may use other emerging elements of data (credit, for example), although the predictive value of some of these emerging elements of data is likely lower for more traditional programs. Some of the new tools and data sources have data that shows they are highly predictive of mortality. Studies have shown that the combination of new tools with traditional underwriting can provide for the most accurate risk selection.

Another key consideration in evaluating tools is assessing how well a tool measures mortality for buckets of risks (lives) versus a specific individual life. Although a particular model may do a better job in aggregate of assigning mortality risks, for any given individual risk, the model assessment may be suboptimal.

Simplified issue products are extremely effective and appropriate in certain markets and distribution channels. Admittedly, they are not attempting to derive the same mortality experience as traditional fully underwritten products, but they do have a place in the market.

Some type of secondary measure of a model defining confidence in the score would be extremely valuable. This has not been well developed yet, but should be a goal of all those using these various models.

The line between traditional underwriting and accelerated underwriting is also blurring. These AUW techniques may help reduce operational costs, but some degree of human intervention can offset any mortality losses. Some companies are using a blend of techniques to balance these considerations.

3.1.3 Percentage of applicants that will meet the necessary criteria to be accelerated

The percentage will vary from company to company depending on the accelerated underwriting program's target market, eligibility, and qualification criteria, all of which are changing rapidly. The percentage also is dependent on the company's desired level of qualification. Companies may begin to compete more aggressively by accepting more risk and increasing their qualification percentages. If this results in insuring worse risks than desired, companies will likely adjust this percentage back down. If the company maintains a low percentage to minimize risk, it may upset many customers who do not meet the qualification standards, and the company will likely lose business.

The responses from the panelists regarding the percentage of applicants that would meet the necessary criteria to be considered "accelerated" had the following statistics: A minimum of 10%, a maximum of 80%, and an average of 42%. Additional commentary is summarized below.

Summarized Panelist Responses

The qualifying percentage impacts the expected mortality, with higher qualifying percentages (i.e., being less selective) increasing the mortality risk associated with accelerated underwriting.

Examples of factors that impact the percentage of applicants who will meet the necessary criteria for AUW are listed below:

- Age - Older issue ages are less likely to make it through AUW. Currently, few individuals above age 50 qualify. The lower the age of applicants in the accelerated underwriting program, the higher the percentage qualification rate.
- Face amount - Larger face amounts may trigger more invasive underwriting.
- Mix of business such as by risk class/score or citizenship status – Preferred risks are more likely to be accepted than standard or substandard risks, and non-citizens are less likely to qualify.
- Target market - Affluent applicants are more likely to qualify, unless their face amount is too high.
- Distribution channel - Substandard brokerage business will return a smaller percentage than direct sales or agency sales.
- Field UW, pre-qualification criteria or checklist – If an applicant does not pre-qualify, they are likely to go elsewhere.
- Number and quality of health questions – The fewer questions, the more difficult it is to design a program that adequately manages risk. The more questions, the more denials and the lower the acceptance rate may be.
- Use of accelerated underwriting analyst to review borderline cases – This will have some impact as more cases will qualify, but the effect could vary from a small to a large impact, depending on what the company wants to accomplish and/or what their instructions are to the analyst.
- Program parameters allowing applicants through – The use of limits related to credit data, and application triage scores, could increase or decrease the number of acceptances.
- Use of "knock out" questions that would send the applicant to a traditional underwriting path
- Program eligibility criteria including product type – The more products under the program, the more acceptances there will be.
- Results of real-time third-party tools
- The risk culture, risk tolerance and profitability criteria of the carrier
- Expenses saved by not ordering labs and exams and corresponding underwriter time savings
- Socioeconomics – This has a major influence on medical impairments such as Body Mass Index (BMI) and the smoker/tobacco penetration rate. The industry should be cautious about the use of socioeconomic data in AUW decisions as it could cause a disparate impact for minority groups. This does not imply that socioeconomic data is not valuable, but companies need to be careful when using this data to select a risk class. This certainly is correlated with mortality, but should be structured to avoid

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 - Disclosure about tobacco use or medical conditions could signal an overall more complete application, which might be a good candidate for an accelerated program if data is available in a structured way.
- Robustness of data – More robust data will increase the acceptance rate.
- Regulatory restrictions on data sources companies can use – Higher restriction will lower the acceptance rate.

As shown above, the rate at which policies are approved through an accelerated underwriting program is a function of many things (e.g., company choice, program performance/degradation, and variables utilized). It is also dependent on the underwriting philosophy of the utilizing company. A company that relies heavily on knock-out criteria in underwriting could use simple rules for a high percentage of cases. While it may be easy to automate knock-out criteria, the biggest challenge with accelerated underwriting, as noted earlier, is identifying the low frequency, high severity substandard, and uninsurable applicants. This can be difficult to do using simple rules.

Some carriers take a conservative approach and target relatively low “Straight Through Processing” (STP) rates (for example, 25% or less) when they first introduce their accelerated underwriting program, with an expectation that they will increase this rate as they gain experience with their program. Other carriers target a higher STP rate (for example, 65%). One panelist believed that currently, it is unlikely that programs using a triage model will have STP rates exceeding 75% because the underwriting data elements are not that sophisticated yet.

This panelist believed it is unlikely that the industry can obtain 75% STP without experiencing higher mortality. While EMR/EHR is promising in terms of its contribution to increasing STP, the lack of uniformity in those records creates a patchwork of formats, which will require EMR/EHR aggregators to perform significant work in order to obtain consistent formats that insurance companies can use electronically. If not in a consistent format, the EHR are essentially just electronic versions of paper copies. The use of high throughput rates, driven by EMR/EHR, will not be employed soon. Most of the experts agree this is at least five years away.

New data sources, unavailable today, may also allow for an increase in the STP percentage. There may be a segment of the population that does not have sufficient data coverage to ever qualify for such programs. In addition, regulatory restrictions are also a consideration, as is the need to develop more nuanced models linking underwriting directly with mortality.

For accelerated underwriting, results indicate that companies will increase qualification percentages to an “upper bound” point where it starts to insure worse risks and, at that point, companies will then begin to limit qualification percentage rates. As was mentioned earlier, there is also a “lower bound” where too many customers become upset about not qualifying. We asked what percentage those lower and upper bounds were today and in 10 years, and the following results were provided.

	Currently	In 10 Years
Upper Bound	minimum 25%, maximum 90%, average 49%	minimum 45%, maximum 100%, average 84%
Lower Bound	minimum 0%, maximum 40%, average 15%	minimum 5%, maximum 80%, average 41%

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 of submission.

Summarized Panelist Responses

Future data technology solutions will significantly impact these rates. If electronic health records become the predominant method for obtaining medical history data, it is likely the percentage of accelerated underwriting applications will be higher. Furthermore, automated underwriting solutions may be subject to a similar adoption pattern as other emerging technologies.

Will “traditional underwriting” even have the same definition that it does today? Accelerated underwriting will continue to grow in the next 5-10 years and most companies will use accelerated underwriting on most of their traditionally underwritten business. However, accelerated underwriting in both five and ten years from now will not look like it does today. The process will utilize both electronic data plus predictive models. Labs could become an additional service to provide someone if they don’t have a doctor.

For individuals who do not regularly see their doctor, or who have had a number of different primary care physicians in the last ten years, it’s more likely the insurance carrier will get an exam and fluids. Also, doctors’ offices do not routinely order all of the same tests as life insurance underwriting, such as a full battery of liver enzyme tests, cocaine, cotinine, A1C (blood test used to diagnose diabetes), Pro-BNP (used to help detect, diagnose, and evaluate the severity of heart failure), and others to come.

The maximum face amount for accelerated underwriting programs will continue to grow. We could expect it to be at \$2.5 million in five years, and \$5 million in ten years. Ten years from now will be very difficult to predict, and will be highly dependent on the new data sources that are available then.

It is very important for regulators and carriers to work together in support of innovation. One panelist believed the current process for buying individual life insurance is atrocious and must be fixed for the industry to remain relevant. Consumer protection laws of the past might need to be revised to accommodate current technologies, without losing the protection afforded to consumers.

3.1.5 Situations where accelerated underwriting is a poor substitute for traditional underwriting

Accelerated underwriting, in its current form, is not appropriate for the situations where the risk of accepting an otherwise uninsurable applicant is material. To the extent that accelerated programs exist more broadly at lower face amounts, the aggregate risk profile is likely to remain similar to what exists for traditional underwriting.

Summarized Panelist Responses

One panelist noted that at the older ages (and perhaps the very young) and higher face amounts where the underwriting savings will not offset any mortality cost, traditional underwriting programs are more effective at this time. At older ages, the value of the APS is higher. As older people typically have a more complex medical history, accelerated underwriting is more difficult on older populations. Also, if there is a high anti-selective risk, accelerated

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 evolve to over time, it appears likely that \$5 million policies will be thoroughly underwritten in the foreseeable future.

Some panelists argued that, in cases of complex or unusual medical history, a human can more easily determine which medical history is most significant and what additional details are most relevant. Others argued that this was shortsighted; an automated process can be trained with the same precedents and make decisions without bias. Human underwriters can be inconsistent. For example, two underwriters might underwrite a case slightly differently or miss certain aspects when the medical history is extensive. Automated rules will almost always be able to more consistently evaluate medications and combinations of medications. Human eyes can better detect one-offs or errors in the data unless the automated technology is programmed to throw out cases that don't meet certain expected parameters.

Target markets or processes with historically low disclosure and high misrepresentation rates pose a big risk. This could be driven by cultural aspects, different distribution channels, and a different collection of medical information (i.e., the agent filled out the application versus the carrier performing an independent tele-interview). The brokerage distribution channels that specialize in impaired risks are a poor candidate for AUW on two counts:

1. There is a higher incidence of misrepresentation, and
2. Even in situations where there is full disclosure, the broker and consumer are seeking a more sophisticated evaluation of the case than will likely be available under the accelerated model.

Accelerated underwriting doesn't work well for substandard or impaired risks. It is also riskier when applied to target markets or pools of applicants with a high prevalence of smoking, obesity, and diabetes. However, if underwriters and actuaries can determine the high-risk groups for additional study, there is no reason one can't apply risk models to segment high-risk populations and eventually get to accelerated underwriting. The barrier is the number of applicants at high-risk levels and the ability to get the medical data required for segmentation, not just the fact they are higher risk.

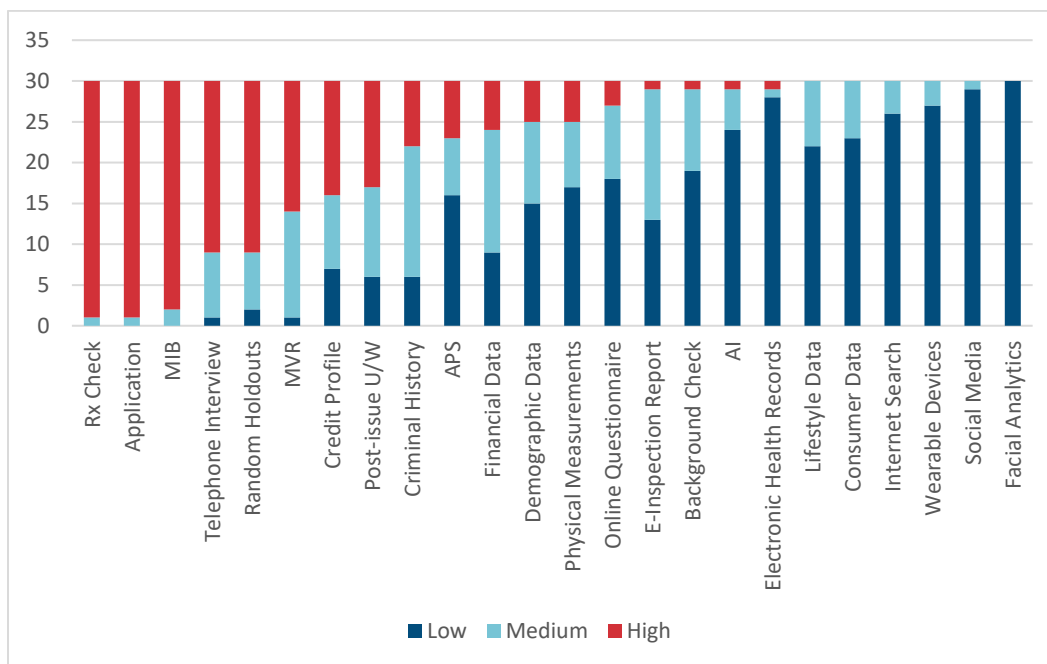
Because new types of data sources, including Rx and credit history, are replacing more traditional information, like lab results, carriers need to have a baseline amount of available information on an individual in order for these programs to be effective. The following may pose a risk for accelerated underwriting:

- Young individuals without a credit profile or Rx history
- Some markets that may not have typical "hit rates" for Rx checks or which may lack typical credit profiles
- Instances in which post-issue APS records may not be available
- Markets with lower education levels and higher rates of nicotine use alongside limited Rx data
- Applicants who have not seen their doctor for an extended period of time may not be aware of certain impairments that would be caught through blood and urine testing. This is true for traditional underwriting as well.

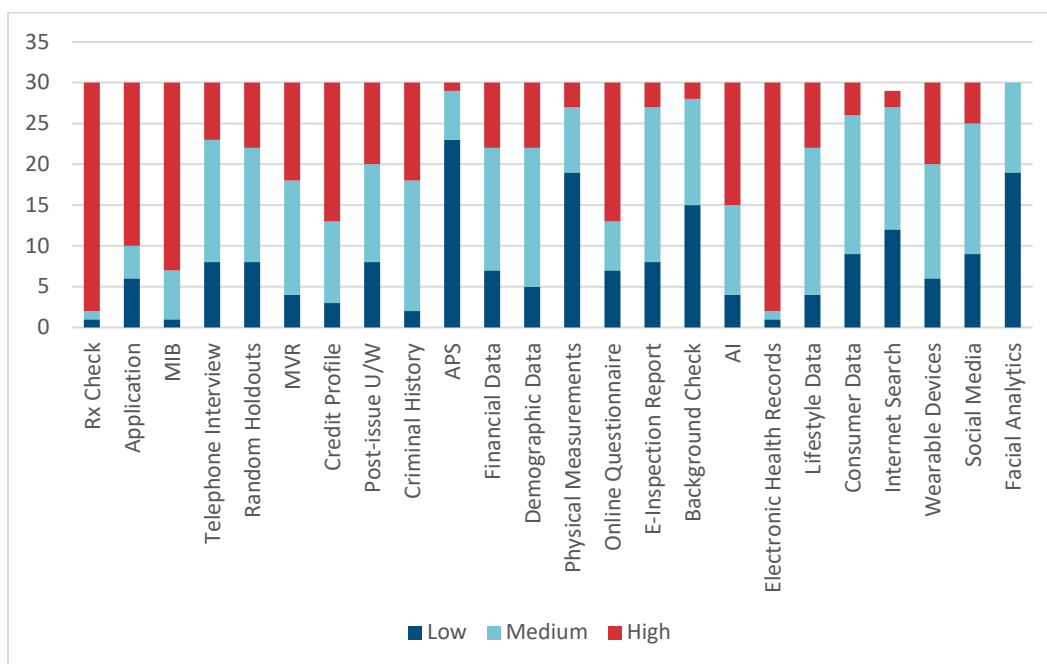
3.1.6 Data Elements

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:



As you can see, the use of EHR is expected to increase dramatically in the future along with other technology driven sources. A couple other areas expected to increase include Lifestyle Data and Wearable Devices.

3.1.7 Comparing Accelerated Underwriting Programs

We asked panelists to provide their definition of an above-average, average, and below-average program. Summarized panelist responses are shown below:

Above-Average

- Uses several data sources and underwriting requirements, both those available today and new ones that provide additional protective value.
- Customer interaction and operations are seamlessly integrated.
- May have digital application capabilities.
- Reflexive application can resolve conflicts with third-party data, for example, asking follow-up questions where answers are not consistent.
- Process involves sentinel effect, where unhealthy applicants apply for coverage where testing is not done, and behavioral economics on the application to generate honest answers and protect against adverse selection.
- Machine-learning models are used instead of generalized linear models.
- Has the same top underwriting class as traditional underwriting to attract the healthiest customers.
- Contains a predictive analytics model and rule set that utilizes underwriting data from the application disclosures captured in a tele-interview, past applications, MIB, Rx checks, Motor Vehicle records, criminal records, credit information, and other publicly available information to decide accelerated underwriting pathway.
- Eventually adding electronic health records as they become more standardized and available.
- Has strong rules for triaging applicants to full underwriting based on the information disclosed.
- Program is designed to change over time.
- Uses a good feedback loop to calibrate the model over time. The model is built to incorporate more sources of data over time.
- Uses a holdout process to calibrate. A sampling of those who would otherwise go through accelerated underwriting are held back for full underwriting.
- Uses agent behavior, as well as other types of models, to control risk for additional anti-selection protection.
- Has appropriate communication to customers and distribution, along with training for distribution, to facilitate understanding of new processes.

Average

Has some combination, but not all, of the factors described in "above average," which may result in more applicants being eligible for accelerated underwriting that qualify for the age and amount parameters.

Below-Average

- Uses fewer data sources, and will likely be quite slow to deploy electronic health records.
- Uses limited or unreliable data that is not subject to the Health Insurance Portability and Accountability Act or Fair Credit Reporting Act rules.
- Uses paramedical or paper application for medical data.
- Relies on one or two pieces of information to make the acceleration pathway decision, like Rx and credit score, as the only gatekeepers for accelerated underwriting.
- Has a short application with few questions, no drill-downs, a high acceptance rate, and limited use of databases.
- Does not use random holdouts or post-issue checking.
- Relies on a small volume of data, possibly using industry data rather than specific to company or market; can exhibit poor data quality; or has a limited predictive model, for example, does not specifically handle smokers.

- Focuses on achieving cost savings and increased market share without investing in much new evidence and, as a result, suffers from significant increases in mortality.

3.2 Ways in which the above methodologies facilitate the measurement of impact on anticipated mortality

3.2.1 Quality of Data Sources and Impact on Mortality

Panelists provided their views on the relative quality of various data sources, in particular with respect to their predictive value in estimating mortality. Reliability and quality of data sources are critical to being able to manage mortality within accelerated underwriting programs. These data sources are oftentimes non-gameable, predictive of mortality, and being relied upon to determine which applicants are the best risks that can be accelerated. Without these data sources, it becomes very difficult for accelerated underwriting programs to manage mortality back to the traditionally underwritten level. The quality of the data sources is generally reasonable, but will get better and more comprehensive over time.

Summarized Panelist Responses

The quality of each individual data source is similar to traditional underwriting; however, it's the different combinations of these data sources that will improve their predictive value. Today, since accelerated underwriting programs are generally requiring different underwriting evidence, the data quality could be slightly lower than traditional underwriting programs. This will result in slightly higher mortality costs. However, over time, the quality will even out and be very similar to traditional underwriting if the target market is understood by the carrier, and if underwriting tools are appropriately utilized. Understanding the data is a huge component of assessing the impact from an accelerated underwriting program. Incomplete data, or data from the wrong point in the process, may lead to false conclusions.

To the extent that the data provided is a comprehensive picture of the applicant, the accuracy of the risk assessment can be high. To the extent that data is not available, demonstrated through a lower aggregate hit rate, or the data is incomplete, the risk assessment may be incomplete and exhibit low accuracy. That said, some risks are more easily caught using Rx history than lab fluids, so new data sources may uncover nondisclosure risks that were previously hidden.

Data gathered from an application has the potential to be quite unreliable. Self-reported medical data has been thought to be less reliable than information obtained through a tele-interview process, particularly with respect to weight or tobacco use, but much of this bias could be due to the influence of an agent or sales professional. Obtaining secondary sources of data may become more important if quality from the primary source of data decreases.

The nature and quality of the data has a big impact on expected mortality because the better that information is, the lower the chance that adverse risks will slip through the process. The quality of the data is impressive and its availability on most applicants, including Rx and credit reporting agency data, is good as well. Some programs utilize predictive models that bring in additional data sources, both internal and external, which supplement the traditional data. When manufacturers use the large external marketing datasets (2,000 or more data fields on a person's lifestyle), there can be errors or omissions in certain data fields, but those do not make a significant impact because any single one of those variables is only a very small component of AUW. It is the concert of all of those 2,000 variables that helps get a picture of the person's lifestyle, which supplements the traditional data, and helps determine whether or not the carrier can waive that blood or urine exam. Some of the marketing datasets can be of low quality and not match appropriately to individuals; to that end, the industry needs to be careful when using this sort of data and make sure that it is compliant with regulations.

With consumer data, it is important to make sure it is accurate, and the more pieces of information pointing in the same direction, the more confidence a carrier can place on the information. That said, consumer data can be helpful, but it is important to make sure the findings relate to the applicant and not someone else in their household.

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 as 10% in some distribution channels with a corresponding exposure in related risk. Some accelerated underwriting programs utilizing random holdouts are seeing a much higher non-disclosure rate than 10% regarding nicotine product use. As pointed out by one panelist, some studies have indicated one in five smokers misrepresent themselves to be non-smokers. There is misrepresentation even among lab-tested applicants.

Data quality concerns will be a major sticking point for regulators and needs to be a priority for the industry. A company and even industry level set of data principles are needed to ensure proper actions. One of the biggest concerns in utilizing multiple third-party data sources is ensuring they all represent data on the same individual. ID verification and matching information across all these disparate sources is critically important.

One underlying assumption in this section is that the models and algorithms in place and to come will be accurate. Time will likely show that some will be inaccurate and produce significant financial losses. Companies that are investing heavily in data analytics departments and staff expect business-altering results to come out of such work. That pressure will lead to errors and mistakes, and possibly even data manipulation to produce “desired outcomes.” Such is common in fields and industries that are heavily data dependent. The life insurance industry is a bit short sighted in not investing as heavily in data analytics auditors whose sole roles would be to check the work of a company’s data scientists for accuracy.

3.2.2 Risk Exposures

Panelists were asked to provide their views on the risks associated with various types of underwriting programs, including both process-related risks, as well as health risks, that will impair future mortality. Responses were generally based on programs as of 2017. The answer to this question may look dramatically different in the future as new technology emerges and as electronic health records become more prevalent. An example is smoker misrepresentation. While a high risk right now, over the course of the next couple years, companies may develop a cost-effective way to better capture smoking status.

Examples of risks that were identified through the research, in priority order, are as follows:

- Nondisclosure / smoker misrepresentation - This risk is high right now, but propensity to smoke models are being worked on and are likely to begin to be introduced in 2018 and/or 2019.
- Agent influence - Steering proposed insureds toward companies with the least robust underwriting requirements
- High blood pressure
- High cholesterol
- Diabetes/pre-diabetes
- Liver function issues
- Kidney function issues
- Regulatory risk (particularly around new data sources) - This is a potential risk if a tool found to be predictive is not allowed by regulation. This is a low to medium risk as the regulators are trying to understand what is being done and applying regulations appropriately, rather than simply restricting companies from using AUW approaches. Use of consumer data may be more problematic due to the associated privacy concerns.
- Legal challenges due to unexpected illegal discrimination
- Medical conditions that are unknown to the applicant
- Algorithms or rules that are not sufficiently robust to evaluate an applicant’s data - This is likely to happen, but if a company monitors the results from the start, they have the ability to take action and minimize any adverse impact. Judgment must be made as to whether or not there is a problem, and this may not always be obvious. If one life is misclassified, is that a problem or an expected level of variance? Answers to this type of question should

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 servicing customers and the ability to quickly make changes when needed.
- Performance risks, including model “drift” (loss of accuracy from the model over time) and misclassification of risk based on predictive algorithms. There almost always is model drift at some point and this needs to be monitored and corrected as soon as possible. After business is issued for some time, it is likely flaws will be found in the algorithm and these should be fixed as well. When fixing these, testing must be done to ensure the fix doesn’t create additional problems.
- Data risks including quality, definition, and timeliness. - Another risk is that the data available will change over time. These are medium risks that can be managed with frequent monitoring of the results and staying abreast of the latest developments in data and potential algorithms.
- Change of insured demographics due to wider product appeal leading to a change in insured population mortality.
- Inadequate rules for risk classification/determination.
- Risk that short-term cost savings gains will be over-valued by management against long-term mortality increases, potentially leading to performance problems for the future. In today’s environment, this is already true and is a high risk. In the future, new tools will be developed to mitigate this risk to a large extent, but losing the exam and fluids will most likely result in overall higher mortality. Most programs are hyper-focused on mortality slippage and understand that they are taking on extra risk.
- Risk of being too cautious with accepting accelerated underwriting, resulting in anti-selection. Those who do not adopt may not have a viable business in five years. This is not the same risk as when preferred underwriting was introduced because lower mortality rates were offered to the better risks, and companies that didn’t have these programs ended up with worse risks. Here, there is a risk that a company could lose market share, but if there is any change to overall mortality, it will be better for the non-adapters because those individuals more prone to lie about their health will seek out accelerated underwriting programs. There is also a risk the healthiest applicants will go to the best programs, and lagging companies may be left with an overall worse applicant pool that cannot qualify for other programs.

Summarized Panelist Responses

Additional details regarding some of the more significant risks are summarized below.

A big risk with these programs is a highly substandard/uninsurable applicant gets through underwriting. Some will get through with better risk classes than deserved, but those cases can be kept to a minimum. Generally, substandard risks are in the prescription database and this data can be used to warn the underwriters that more underwriting might be needed. Also, predictive models have proven to do a good job predicting which applicants might be substandard, making it less likely for them to make it through underwriting without fluids. Labs and measurements are not a failsafe against anti-selection or misclassification. For some applicants, new underwriting data is more valuable than blood and urine; perhaps not for all, but for some.

There is also a risk of concentration of sub-quality business for a company if its accelerated models have less quality and thoroughness than their peers in the industry. The risks vary significantly by the target market segment and distribution channel. For truly independent distributors that are “spreadsheets” cases and highly sophisticated in knowing which applicants to place to which manufacturers to maximize risk class and commissions, the risks are the

highest. If the producer knows, based on recent applications, that certain applicant profiles are not going to get tested for smoking, that producer might be incented to influence the applicant’s response to that question on the application. The same risks exist in traditionally underwritten programs where sophisticated producers can find loopholes in underwriting from certain carriers. Insurers need to have strong monitoring processes to ensure that they discover any unexpected volumes or changes in business mix early on.

Another primary risk exposure is change in applicant behavior given their knowledge of underwriting tools. Were the applicant pool to remain identical, there is a conservation of lives principle in place resulting in the same aggregate mortality for a given pool of applicants. To the extent there is a change or potential change in the applicant pool, there could be a change in aggregate mortality results. A risk here is that applicants and agents learn of differences between programs and do a good job selecting the carrier that gives that applicant the best offer. If they were regularly able to find carriers that placed them in better classes, the preferred class mortality may deteriorate. That said, this practice happens today with agents who understand the underwriting process at different companies.

The increased mortality often impacts not only the business through accelerated underwriting, but also the business moved over to full underwriting. For example, if the better credit risks are accelerated, then the triaged risks going through full underwriting will have worse than average credit, which is correlated with higher mortality.

The design of the application can have an impact on the results. Currently, there is higher honesty in tele-applications than in agent or paramedical completed applications. Going forward, the assumption is most applications will move to a digital environment. By pre-populating an application with data that is already known, such as demographic data, MVR, or Rx data, more honesty may occur by showing the applicant that you already know a great deal about them and the application is as much about confirming that data as about providing new data.

Ways to combat non-disclosure include having a sentinel effect to encourage honesty. This could be reminding them they are required to disclose impairments as part of the contract. Holdouts (requiring full underwriting on a small percentage of otherwise accelerated-eligible cases) can help here, too. Also, following through on contestable claims will impact mortality results. Reminders about truthfully disclosing impairments is also helpful. There are several behavioral economics studies about methods to promote truthful disclosures. Contesting fraudulent or misrepresented claims is also important. This may require additional resources and care should be taken as bad press from an inappropriately contested valid claim can be detrimental.

Another risk not yet mentioned is that once models are introduced and accelerated underwriting programs become widespread, some of the data the models were built on is no longer populated and updates to the model can’t appropriately reflect current trends. For example, almost everyone uses MIB checks. Once a significant portion of cases are approved through accelerated underwriting, there will be no detailed MIB coding on these cases or any consistent way to code one company’s accelerated underwriting program versus another. So, that data source loses its predictive power.

3.2.3 Substandard Risks

As mentioned earlier, substandard/decline risks entering the accelerated underwriting pool of business are a risk. This is a low-frequency, high-severity risk. We asked the panelists to provide their views on the percentage of policies that would have been declined under full underwriting that would be accepted under an accelerated underwriting program. We also asked how much higher the mortality assumption would be for a declined policy versus an accepted one. The results are in the table below:

Accelerated Program	Percent (min,max) average	Increase in Mortality (min,max) average
Above Average	(0,15) 3	(200%,600%) 375%
Average	(.75,20) 5	(250%,600%) 386%
Below Average	(2,40) 10	(250%,600%) 395%

3.2.4 Mortality risk indicators that are more difficult to capture

Panelists were asked to provide their views on indicators of higher mortality that may be difficult to capture through accelerated underwriting programs. Their responses are shown below.

Certainly, there are many risk factors that are directly identified in the traditional underwriting process that now are inferred, triangulated, or otherwise built by other data elements and their interactions. All of this is predicated on an assumption of the client self-disclosure rate on the medical history questionnaire. Obviously, high levels of disclosure mean the value of any specific subsequent requirement is muted.

Examples include:

- Tobacco and non-prescription marijuana use
- Undiagnosed hypertension, hyperlipidemia, and/or diabetes/pre-diabetes
- Alcohol/substance abuse and illicit drugs
- Kidney and liver function problems; Proteinuria
- HIV
- Coronary Artery Disease markers
- Basically, any misrepresented or undiagnosed condition that can be routinely discovered on labs or in a routine APS, including cholesterol and liver enzyme tests, weight and other vital statistics currently gathered by paramedical examiners. Anything related to non-disclosure that takes considerable time to test or determine.

Other medical conditions might be undiagnosed in younger applicants who are not getting regular medical care. Any conditions that don't require prescription medication would also be more difficult to identify unless disclosed on an application.

3.2.5 Impact on the Underwriting Class Distribution

Accelerated underwriting may result in a different distribution of lives by underwriting class. Panelists were asked to provide their views on the extent and nature of the potential changes.

Summarized Panelist Responses

The underwriting class distribution of accelerated cases will be highly dependent on the program design. This breakdown is extremely specific to the individual program in place. Working with two different accelerated underwriting programs, you will see two very different breakdowns. Furthermore, many accelerated underwriting programs don't decline all applicants, but many function as a triaging process, knocking out ineligible applicants who then are manually underwritten. Under accelerated underwriting programs, the definition of each of these preferred classes will evolve. For example, cholesterol criteria based on blood collection will not be used; however, other data-driven criteria will enter the picture that could capture this risk. Exactly what those other criteria will be is hard to predict.

In a well-designed program, proportions should not change much. Only better risks would be accelerated, and worse risks would still be manually underwritten. Depending on criteria used for super-preferred, there would probably be a slight shift to super-preferred since "knock-outs" for blood pressure, BMI, and cholesterol would occasionally not be caught. Ratings and declines almost never come from potentially accelerated cases. In one company's detailed back-testing modeling, roughly 0.2% of accelerated cases that would otherwise be declined receive an offer of coverage (often rated or standard rather than preferred). The program design will shape the mix of business and the underwriting class distribution.

On the other hand, there is always an element of mortality slippage that occurs when guidelines change. In accelerated underwriting, the problem is not the very small number of misclassified policies, it is that the impact of a misclassified decline is extremely significant relative to the expected mortality of a healthy population. Even one or two declines slipping into an approved population could skew the mortality results by a significant margin.

Any accelerated program is likely to make a small number of poor underwriting decisions, both cases where a better class is offered and where a worse class is offered. The latter may be viewed as problematic from a regulatory perspective, while the former is very costly to the company. However, this shouldn't be very different for accelerated versus traditional underwriting if the tools and models are well understood as they relate to mortality risk.

It is possible to calibrate the accelerated underwriting program, especially if using a predictive model trained from the traditionally underwritten business, that achieves at least the same distribution for standard and preferred risks. Note that even if a carrier achieved the same distribution as with traditional underwriting, the individual lives assigned to each class would overlap, but not be identical to the traditionally underwritten lives. This is true for any type of underwriting guideline change that is calibrated to reach the same distribution of class offers.

In the end, the company can set the distribution goal to whatever they want. The goal of most companies is to match the traditionally underwritten results, so they will attempt to have the same percentages.

3.2.6 Impact on Mortality relative to Traditional Underwriting

The Researchers asked panelists to provide their views on the impacts to mortality of using AUW relative to traditional underwriting programs.

Summarized Panelist Responses

One consideration is the mortality impact accelerated underwriting programs will have on the portion of the business that is not accelerated. The traditionally underwritten business will consist of a larger proportion of marginally healthy lives because more of the healthy lives are successfully getting through the accelerated process. At a minimum, it seems the mortality is likely to increase significantly on an aggregate basis for the non-accelerated business.

The companies that have good monitoring practices in place with appropriate risk measure controls should experience better mortality than other companies using AUW, but not necessarily better than traditionally underwritten business. It really depends on the design of the program. There is a tradeoff between acceleration rate and mortality slippage or worsening. The higher the acceleration rate, the more mortality slippage there will be. The more data sources that are used and the more sophisticated the predictive model, the closer to traditionally underwritten the mortality can be. Overall mortality is anticipated to be higher, but difficult to determine with any degree of certainty at this point given the current low sample size. On accelerated business only, based on panelist responses, it is anticipated that the overall increase in mortality rates will be:

- Minimum -5%, maximum 25%, average 4%

This is based on models currently in use today. While most panelists believe that mortality will increase overall, some panelists believe that AUW is actually reducing overall mortality levels. As these models continue to improve, panelists expect mortality to decrease. This could happen over the next 3-5 years, so the percentages shown above may only be relevant for a few years of issued business. However, it is difficult to say what the mortality will be in the future based on new tools until it is known exactly what those new tools are and what information they provide.

One panelist indicated that drivers of mortality for younger ages are more likely to be related to behavior and accidents than medical problems, so there is likely to be a less significant mortality impact for programs that have a younger average inforce population. There would be a slight negative impact (since new data sources are less useful in identifying health problems at younger ages) unless you are able to attract an overall healthier population due to a better client experience.

One panelist believed that applicants with younger ages and lower amounts could see less negative impact as there are generally fewer "false positives" in those applicants due to fewer requirements ordered for them. In addition, the mortality impact would be higher for females given the likelihood that females are approved more frequently by accelerated underwriting programs than males, in comparison to traditionally underwriting business.

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, in the future, accelerated underwriting principles can drive lower mortality by achieving better segmentation than is possible using traditional underwriting. Unfortunately, some companies are introducing accelerated underwriting programs that are not well thought out and they will likely experience more adverse mortality than under their traditional underwriting approach. However, it will take time and more data sources to be able to build models that can predict mortality and, thus, result in lower mortality.

In aggregate, expect mortality for these businesses to be worse than traditionally underwritten business. However, companies that design quality accelerated programs while attracting a healthier customer base could end up performing comparably to some traditionally underwritten lines of business if they are able to attract and place a healthy subset of the insured population. For example, tech-savvy companies may attract applicants who are younger, more likely to disclose medical information, or more likely to have data coverage, while less healthy applicants might be likely to seek out an agent who can make a strategic decision about placement.

So much of the mortality conversation is relative to a company's starting point – what kind of underwriting system did they have (knock-out or holistic) and how well-trained their underwriters were. The argument for more consistent underwriting results creating mortality value could be important for a company that had poor human underwriting and very high underwriter error rates. A company with good human underwriting wouldn't see this benefit. A company currently using a knock-out system of underwriting could see mortality improvement in some instances as an accelerated program using a predictive model can account for covariance not caught by the knock-out rules. A company currently using a well-designed, holistic underwriting system wouldn't see these benefits.

In order to judge overall mortality impact, companies need a strong understanding of their decline and not-taken mortality. These cases will now be placed in an accelerated program to some extent. Rough estimates of these can lead to very misleading overall mortality estimates for the program. Company-specific studies of the mortality of these segments are needed to see overall impact.

3.2.7 Impact on mortality curve and grading by quality of accelerated program

We asked panelists to provide mortality input on how different quality (robustness and accuracy) accelerated underwriting programs compare in terms of mortality curve expectations to traditional underwriting. Results are shown below.

Accelerated Underwriting Program - Robustness/Accuracy	Slope of Curve			Length of Select Period			# of Years to Grade into Fully Underwritten (min,max) avg.	Mortality % Differential (+ if worse/- if better) (min,max) avg.
	Similar	Flatter	Steeper	Similar	Shorter	Longer		
Above Average	Similar			Similar			(0,15) 8	(+0,15) 3
Average	Similar to Flatter			Similar to Shorter			(5,20) 13	(+4,25) 8
Below Average	Flatter			Shorter			(15,25) 20	(+7,35) 17

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 "polluting" the preferred class, the difference in mortality could persist for many years.

3.2.8 Emerging mortality experience impacted by accelerated underwriting - in policy years immediately after issue and in the long term

Panelists were asked how emerging mortality experience would be impacted by accelerated underwriting - in policy years immediately after issue and in the long term with the following results.

Summarized Panelist Responses

One panelist pointed out that, if the results were demonstrated immediately after issue, then the program was deeply flawed. The long term is where the true impact will be accurately measured for a well-constructed program. If done right, the accelerated underwriting mortality could be better than traditional underwriting mortality. Most of the impact should be more long term, although there could be some declines that get through that could impact early duration experience and, in some cases, these would be rescinded. Also, standard risks that are erroneously classified as super-preferred would impact super-preferred mortality to some degree in all durations. For example, if a standard risk was placed in the super-preferred class, we might expect that individual to have mortality that is 150% higher than the rest of the super-preferred class, which increases the mortality in all durations for the cohort. However, it could be that the company had the risk wrong for that applicant in traditional underwriting as well.

Another panelist indicated that, in the years immediately after issue, there was likely to be a mortality cost that could be largely offset by the underwriting cost saved. In the very long term, the underwriting effect would wear off and different risk classes would converge. Long-term mortality might converge if all the unhealthy applicants that were mistakenly accepted through accelerated underwriting died, resulting in a population that more closely resembles traditional blocks. It would not be due to convergence of risk classes.

Early results are useful to evaluate closely because companies have the contestable period to rescind the early claims to the extent there were non-disclosures by the applicant. These issues could then be studied to get a better feel for

longer-term mortality (in other words, if there is a common non-disclosure theme, early information on this could help with predicting the long-term mortality impact).

It's possible that the shape of the curve will be different in later durations or that the population is changing in an unexpected way. It is really still too soon to tell, because measuring mortality experience over a longer period than current programs have been running is needed to do so.

One panelist worked on two fluidless programs and neither had seen any significant change in mortality experience within a few years of program launch. It is possible that these programs had identified a particularly healthy subset of each underwriting class, but it is also possible that the slope of the curve would be different than expected for these populations. On the whole, these programs will likely see some increase in mortality over expectations for the same distribution with full underwriting.

Another panelist pointed out that mortality experience was dependent on the "miss profile" of the model. If the model hardly ever missed but, when it did, it missed big, there would be a very different answer than if the model missed a little more often but smaller. Missing declines would result in noticeable early duration mortality differences that quickly wear off. Single class misses would not be noticeable in early durations, but would build over time. If there were enough scale to accurately study mortality by duration, accelerated underwriting mortality would be close to non-accelerated underwriting mortality for the first 5-10 years, with more noticeable differences appearing thereafter.

One view was, in the long term, expect potentially better experience both at short and long durations as new technologies and information that help in risk selection are implemented that allow for greater analysis of applicants in an accelerated manner on both a pre- and post-issue basis. Examples include the implementation of EHR on a pre-issue basis, and tracking an applicant's health on a post issue basis using tools like 'fit bits.' These are a couple of good examples of improvements in the future, but there are many more. With technological improvements there will be many more, some not even conceived yet.

One panelist from a carrier using an Rx score stated that they've increased business by about 20% and incurred no claims that they wouldn't have taken under their previous model of underwriting. However, the panelist indicated that there was only 1 to 1.5 years of exposure so far.

3.2.9 Sentinel effect resulting from not collecting fluids

In general, panelists agreed there is a sentinel effect loss, but there are also offsetting factors. More anti-selection will be seen, especially with tobacco usage, which may be harder to detect through traditional means in accelerated programs. The offsetting factors are the inclusion of nonmedical information not previously secured in traditional underwriting and certainly a reduction in underwriting requirement costs. The addition of other tools, such as Rx histories, non-medical credit, and lifestyle models could offset this a bit, as could a random holdout and/or a post-issue APS auditing program. Random holdouts and a triage approach (using alternative scores or predictive models) add "uncertainty" to the process and provide a sentinel effect. The downside is that distribution prefers an underwriting paradigm where the consumer knows the exact path upfront.

Summarized Panelist Responses

Some customers who were sold on accelerated underwriting and randomly selected for traditional underwriting would perceive "bait and switch." Over time, the industry may need to develop a degree of explanation of triage actions analogous to what it does for adverse final actions.

One could argue that requiring traditional labs and measurements does not equate to an applicant being 'prevented from a policy.' Random holdouts may seem "unfair" from the customer's perspective in that some are randomly selected to be traditionally underwritten; however, most clients don't realize they have been arbitrarily held out, and it doesn't impact the customer experience significantly more than other types of knockouts.

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. They are better at assessing medical issues than a paramedical or agent. Telephone interviews provide increased disclosures that can offset risk for known medical impairments. There are several organizations that are working on smoker models or non-disclosure models (liar models) that can pick up the high-risk cases. The value of the personal history interview or tele-interview to the accelerated process is significant.

Some additional areas that could impact the level of anti-selection or non-disclosure include:

- The distribution model and corresponding type of sale.
- The level of acceleration - As the percent of sales that can be accelerated without fluids increases, so does the client's motivation to anti-select. On the flip side, if fluidless is a result for only the minority, and most will still need fluids, it is more likely that clients will disclose.
- The application design - Reflexive and drill-down questions will lead to better client disclosures. Utilizing behavioral economics principles in redesigning the application experience will also counteract some propensity to misrepresent.
- Interactive applications - Querying data sources in real-time as the application is being filled out, and making adjustments based on that data, will help with increasing applicant disclosures. A perfect example is Rx. It can provide very helpful inputs, but for real time adjustments, it can become unwieldy for a history of 10 or 20 different medications. The time it takes the applicant to answer, as well as changes in the applicant's answer, also hold usable information.
- Advisor attestation & "liability" - Adding a formal sign-off that requires advisors to attest to the validity of their client's answers will introduce them as more of a sentinel in the process. Building in advisor penalties for having too many "liars" will also help. In many cases today, the agent never sees the applicant in person, which can create further challenges.
- Client penalties, whether this is in the form of post-issue Rx or APS, or even a random holdout with full underwriting. If a client is found to have misrepresented on the application, the threat of certain penalties could be enough to persuade them to continue to disclose.

3.2.10 Measuring Performance

We asked panelists to identify indicators or approaches used to measure the performance of an accelerated underwriting program and, for each indicator, to estimate how long it takes from the beginning of a new accelerated underwriting program until that indicator would produce useful credible results. The results are summarized below:

Random holdouts

- Those who would otherwise go through accelerated underwriting, but are held back for full underwriting
- Around 200 cases are needed to smooth out some of the volatility, but even 50 cases will start to give you a feel for what risks are slipping through
- It takes 2-3 months to a year depending on application volume to have useful information
- The larger the size of applicants and holdout % the quicker the results are useful
- Results get credible fairly quickly

- 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
- If more data elements are used for monitoring, such as a combination APS, MIB, and Rx rechecks, the results become credible fairly quickly

Mortality experience

- Actual mortality experience for the accelerated business is evaluated and compared to expectations and/or traditional experience
- This approach may require a few thousand cases to reach full credibility, but a carrier can identify gaps early on, especially around significant medical conditions that drive early deaths
- In general, it could take 3-10 years or more
- Monitoring early duration claims experience very closely, especially during the contestable period, can help to identify adverse trends that may have long-term implications
- Lower program volume and/or better expected program results will generally result in lower numbers of deaths and a longer time to credibility
- Early duration mortality will emerge within two years, but longer-term mortality will take a decade or more to emerge

Acceleration rate

- Measuring the proportion, or rate, of accepting applicants into the accelerated program relative to expectations, or with trends over time, is a useful performance metric
- Using confidence intervals, this can be measured immediately. Since this is a binomial distribution (either accepted or not), it will reach credibility quickly, perhaps less than 1,000 cases
- It is a relative measure, so it is important to measure the acceleration rate against expectations for the cohort, looking at experience for a period of two months to a year to have adequate credibility
- Less robust programs, from a mortality standpoint, would likely have higher acceleration rates. This is not necessarily a negative if the risk is priced correctly
- Reviewing trending over time for stability is helpful in identifying potential concerns
- The pass, or acceptance, rate will inform whether the program is successfully identifying the expected segment of the population for the program. If the pass rate is too high or too low, the population distribution may be significantly different than expected, and if the pass rate is too low, it may not deliver expected business value. Furthermore, class distribution should match an expected distribution. If any distribution is significantly different than expectations, it is important to know what drives the deviation
- This is an ongoing challenge that requires continuous monitoring and improvement

Other indicators

- Applicant disclosure rates as compared to traditional underwriting business (for example, rate of disclosure of specific medical conditions, use of nicotine, etc.). Comparing disclosure rates may identify gaps, particularly if segmented by producer, distribution method, or geography

- Early lapse rates, which may be an indicator of “churning” (deliberate policy replacements by agents) or bad sales practices arising from the simplified process
- Early claims, including evaluation of the cause of death and information found in the investigation that may show items not caught during the underwriting process
- Speed to issue, including comparison of speed to expectations for the program
- Distribution monitoring and, in particular, looking at the prior distributions of the business (i.e., by risk class, smoking status, BMI, etc.) and comparing to the new distribution with accelerated underwriting. This can gain credibility faster, but again depends on the size of the company
- Cost and efficiency savings, including comparison to expectations
- Customer experience metrics such as turn-around time and placement rates. These can be evaluated in the first year and on an ongoing basis

3.2.11 Distribution Channel

Panelists provided their thoughts on how various distribution channels might impact the effectiveness of accelerated underwriting techniques.

Summarized Panelist Responses

Career distribution systems generally have a greater tie to one company’s results and, therefore, should experience overall higher levels of client disclosure, even through accelerated underwriting programs. They have advisors who work more directly with the applicants to understand the importance of being honest on the application. Additionally, sales from career advisors are generally more value- and relationship-based than price- and transactional-based.

It’s true that captive field force experience should be better than brokerage experience, but captive agents are more likely to coach applicants through the application, so there may be less non-disclosure in the direct-to-consumer space, at least until it becomes more popular.

Typically, there is more anti-selection in the independent distributor space, which can lead to higher pricing assumptions. As carriers roll out accelerated underwriting programs, they will need to monitor advisor activity to lessen this impact. Some distribution companies have built their entire sales models around anti-selecting against their carriers by finding the best company to take a certain risk. This will continue to have a large impact on mortality. However, it is not clear whether the impact of this will be larger or smaller than what we see in the traditional underwriting business today.

Most AUW tools assume the overall characteristics of the applicant pool don’t change substantially. To the extent that distribution can impact who applies to which company in what scenarios, the underlying risk characteristics of the applicant pool can be shifted considerably.

Distributors control the front of the funnel for these programs and can direct higher risk applicants to accelerated underwriting programs in higher proportions, injecting unexpected bias. As the utilization of accelerated underwriting programs increases, this risk is diminished. The risk is spread across more programs and companies, but the applicants might also increase.

One panelist commented that broker/dealers and wire houses likely would not produce enough volume to spend much time on figuring out how their clients could anti-select and were less likely to “coach” their clients to misrepresent or omit information in the near term. In the longer term, specific vulnerabilities would become apparent in the programs of different companies and, at that point in time, the brokerages would begin to leverage those weaknesses just as they leverage impairments under full underwriting.

There are concerns that brokerage general agents, or any channel that shops cases with multiple carriers, will potentially have higher anti-selection in an accelerated underwriting process because they can attempt the process with multiple carriers and see if they can get an offer without fluids. This concern may exist for captive agents as well,

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.

Spreadsheets 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 initially under accelerated programs. However, utilizing analytics around agent behaviors might mitigate this risk eventually, as long as an action is taken as well.

Process plays a big part in these programs. Underwriting evidences are ordered by the carrier, not the agent. The agent needs to give up some control for this to work. If agents are not willing to give up this control, these programs will be subject to higher volatility in their results.

It is also important to keep in mind the socioeconomics of the markets typically served by different distribution channels and where accelerated sales are materializing relative to the universe used to build the model(s).

Some insurtech direct writing companies are attracting a young, healthy, and financially savvy population that may outperform expectations.

3.2.12 New Customers

To the extent these new accelerated programs are successful in attracting new customers and reaching the underinsured middle market, the demographic, lifestyle, and medical characteristics of these new customers may be different than historical life insurance customers, which could impact mortality results. The table below shows panelists’ views on the percent of the accelerated program customers that are new customers from a previously underinsured market, and what their mortality is, expressed as a percentage of the historic traditional underwriting customers’ mortality.

	(min,max) average
Percent of new customers	(3%,30%) 14%
Relative mortality	(100%,190%) 114%

3.2.13 Automation and Confidence to Mortality Decisions

Panelists were asked whether automation used in accelerated underwriting would add more confidence to mortality decisions, what post-issue actions or risk mitigation techniques were used with automated processes, and what their efficacy/value would be.

Summarized Panelist Responses

In the long run, automation will add confidence. Refining underlying rules, along with knowledge gained from experience, will improve underwriting decisions and overall mortality. A post-issue monitoring plan is key in accelerated underwriting programs, whether decisions are automated or not. Some techniques used are MIB Plan F (electronic information product to exchange consumer information among insurance and healthcare corporations),

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 table.

It will take many years for the automated systems to be able to handle rules that are more complex than what humans are doing today. Eventually this will happen, but so far, the industry seems to be struggling with being able to automate a significant portion of the underwriting due to the complexity of multi-variate thinking.

For the home office, there is more confidence, but for the agent and consumer, not always. A big issue for the consumer is whether they are being treated fairly. Transparency and communicating effectively with field partners and customers is important.

To the extent that human underwriters are being bypassed, the human error rate is a factor to consider as well. The human factor can have both favorable and unfavorable consequences. At its best, it allows for better analysis of complex risks, however, it is also a source of errors. To the extent that it can be quantified, some of the mortality experience attributable to underwriter error can be used to offset extra mortality believed to be generated from the accelerated program. This step, however, requires both an effective underwriting auditing program and a rigorous, as well as probing, analysis of claims experience.

The caution with post-issue checks versus holdout samples is the public and regulatory reaction to accelerated programs acting like bait-and-switch programs. The line between lying and simply forgetting is very blurry. This will be exacerbated as companies move to digital medical history questionnaires that don’t have human involvement to answer questions. If post-issue checks only rescind or reform coverage in only the most obvious misrepresentation cases, it’s fine. If cases are approved quickly and then changed later because of discovered information that a client simply forgot, that’s a dangerous game to stay away from as an industry.

3.2.14 Exceptions

Panelists were asked whether there was similar ‘exception’ activity in an accelerated program as in a traditional underwriting program where exceptions were often allowed and, if so, to describe the types of exceptions that were occurring, and how they might impact mortality experience.

Summarized Panelist Responses

Given the competitive pricing nature of term and other products, few exceptions are allowed. Each exception should be documented, priced out and signed off on by underwriting management. One company had less than 25 exceptions last year out of more than 120,000 submitted applications. These were mostly due to misstatements from someone in the new business or underwriting area.

Some complex cases where exceptions are frequently allowed are knocked out of accelerated programs entirely to avoid designing a more complicated system. In other cases, impairment-based underwriting may allow for limited professional judgment to adjust a recommended class or for an agent to request a reevaluation.

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 believed the applicant to be. Each applicant gets a unique score from 0-100. One panelist had a designed program that does the following:

- For females under the age of 35, waive the blood exam if the model score is 50 or better
- For males between the ages of 60-65, waive the blood exam if the model score is 95 or better

There are codified 'stretch' guidelines that still apply for accelerated underwriting. True exceptions would be much rarer, although not beyond the realm of possibility for any type of underwriting program.

To the extent that any automated underwriting algorithm replaces underwriter discretion, overall mortality experience is likely to be more consistent. This is already being shown, with underwriting algorithms able to differentiate mortality risk among applicants with a similar medical condition such as insulin-dependent diabetes. Some of the current scoring algorithms can determine that some of these applicants are good risks and some are poor risks.

There needs to be a distinction between accelerated underwriting programs and automated underwriting programs. For an automated program like a rules engine making the decision, the exception rate is very low. Carriers often cite consistency in underwriting decisions and lack of exceptions as a benefit of offering such a program.

Exceptions may go against one of the desired outcomes of an accelerated program, namely consistency of underwriter results. Certainly, any exception activity would have negative mortality consequences. Any exception activity, even if much less than on traditional business, will have a negative impact because the algorithm has been designed to give the correct results. Any exceptions to this will have a negative impact on the mortality results. Exceptions could destroy the validity of the accelerated underwriting model.

Exceptions may never go away. However, it may take agents a while to figure out how to ask for exceptions under the new paradigm. Companies will be firm, without exceptions, on following the algorithm for who gets their requirements waived (except for random holdouts), and particularly for who must go through full underwriting.

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 significantly and are likely to impact the level, slope, and length of the select period. In addition, to the extent these new accelerated programs are successful in attracting new customers and reaching the underinsured middle market, the demographic, lifestyle, and medical characteristics of these new customers may be different than historical life insurance customers, which could impact mortality results. These factors may imply that industry tables are not a good starting point.

Another thought was the current industry tables were a reasonable starting point, but the slope and ultimate level of mortality likely needed adjustment. The “shallower” select shape (in other words, the lesser extent to which mortality is reduced in earlier durations due to underwriting) might be very slight and potentially not noticeable, especially in future generations of accelerated underwriting.

Another reason the current tables are a good start is that most accelerated underwriting processes are simply trying to set parameters to predict the current underwriting decisions and risk classes. Mortality for products that offer accelerated underwriting is most closely associated with mortality for products that use full underwriting. Slope and select period are fine. It would impact the select factor where there are misses, such as a substandard applicant receiving super-preferred. Differentiation between classes might be smaller in poor programs, and close to full underwriting today in strong programs. Current tables are a good starting point and the goal with the algorithms is to emulate full underwriting. However, the missing medical information, until it is available from some new sources, and credit information could potentially lead to different slopes and levels of mortality. Many companies are ignoring the additional mortality from the lack of medical information. They say it is offset by expense savings. While this may or may not be true, companies may not be assuming extra mortality here as they are setting premium levels the same as traditional underwriting business and, in a few situations, even lower.

One other point regarding current tables was that it might take a number of years until we know the answer to whether they are a good starting point as the programs are new and it will be difficult to learn much from the early experience, especially while still in the contestable period. For those who happen to die during the contestable period who had acquired the policy with false information, the policy could be contested. However, many more may have hidden some medical issues that survived the two-year contestable period. It is worth the risk because if you happen to get selected for full underwriting, you can say you are no longer interested in the policy. This person could apply at multiple companies, probably making it through the automated process of at least one.

To the extent a somewhat conservative approach is taken to setting up these accelerated underwriting programs and the company is monitoring and controlling the risks being accelerated such that the mortality stays very close to existing traditional underwriting mortality, the current structure of mortality tables makes sense. If companies push the envelope more towards higher acceleration rates, then the existing structure will no longer make sense as anti-selection and misclassification will impact the amount and duration of selection we would expect. However, over time, that should be captured by an individual program’s actual-to-expected analysis. The industry tables still provide a helpful starting point.

If the accelerated underwriting program utilizes a risk classification target, then the program is tuned to recreate human underwriter decisions. Therefore, the resultant mortality of the accelerated underwriting program should be very close to the assumed mortality of the classes. The level of mortality impact is determined by how often and how big the model misses. Given the quantified expected mortality performance of the model, it can be determined

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. Over time, for VM-20 purposes, there will be enough experience on products that offered accelerated underwriting, although there may be a struggle with different versions of accelerated underwriting programs; at that time, the actuary can use historical experience to justify selection of an appropriate table. It is going to take many companies a long time to get enough credible experience to justify assumptions. Early indicators from monitoring will be key.

Most of today's tools are measured against a variety of industry tables and reflect a variety of mortality risks. One panelist's company scored applicants that came from different pools, such as a super-preferred multi-million-dollar term shop, as well as declined, low face amount (i.e.\$5,000) final expense policies, sold through direct mail. Each of these applicant pools is likely to continue to exhibit their same slope over time, but these slopes are dramatically different from one another.

The weakness of accelerated underwriting with regard to defining assumptions is that there aren't any longitudinal datasets to allow the study of the mortality, yet. If class mix changes dramatically, then mortality slope and level for each class should be reviewed. Many of the newer underwriting data and tools do have longitudinal studies that can be layered on top of a company's own longitudinal mortality study.

Class mix is another factor not previously mentioned. One particular challenge here is that, even if you have certain model properties available across a historical dataset, it is difficult to simulate all data types over time at the time of underwriting. For example, one panelist had a challenging experience trying to obtain historical credit data to develop a new predictive model. Credit data properties changed over time and were not available going back farther than about 60 months. This will improve over time.

The length of the select period has grown over time as more information has been collected in the traditional underwriting process. In fact, with the 2015 VBT, it was realized that the 25-year select period might actually be too long. With less underwriting information, the select period would be shorter and this would also impact the slope.

One panelist thought the slope might follow the path outlined below:

- Very close to traditional underwriting business for the first two years, as there is still protection by the contestability clause
- Marked increase in years 3 and 4 due to anti-selection that made it through the accelerated underwriting system
- Grading down to traditional underwriting business over the next 10-15 years as chronic conditions have not materialized yet
- Grading up to attained ages in the 80s as missed chronic conditions are starting to manifest
- Finally grading back to general insurance mortality as the effect of selection wears off

Another panelist noted that industry tables did not currently match any an individual company's mortality experience. Variations in underwriting programs are not perfectly reflected in these tables and there is still quite a bit of judgment used in the later duration slopes. Do industry tables needed to be padded for accelerated underwriting? It depends on the quality and performance of a company's specific solution. The burden should be placed on the companies' actuaries to model and demonstrate how they arrived at a specific industry table or their own experience.

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 Mortality Assumption

Panelists were asked what approach they would use to determine a best estimate mortality assumption for business that was subject to accelerated underwriting, with the following results.

Summarized Panelist Responses

According to one panelist, this is an extremely tough question, “what should my pricing mortality be if I switch to this new underwriting process?” This is a non-trivial question and absent a retrospective study for a specific carrier with their claims experience, the only way to address this is the leap of faith that the algorithmic underwriting method is better, and that issuing the same percentage of business should lead to improved mortality results. It should not be a complete leap of faith that algorithmic underwriting is better as there should be some results based on historical data (while not perfect) to make an assessment of the expected mortality.

One approach is to start with the pricing assumption for traditional business and then adjust for the underwriting requirement changes associated with accelerated underwriting. Adjust further by protective value studies and back-testing on any predictive analytics model, and close monitoring of accelerated underwriting business will further help with assuring the correct mortality assumption. This would include the adverse impact of removing paramedical exam and fluid testing, but might also include mortality benefits from adding new tools such as tele-interviews and credit/public records data. The mortality impact of these new tools could be estimated by doing retrospective studies, protective value studies, and/or working with reinsurers and consultants that have a broader perspective.

Right now, one panelist’s company is trying to use a process that produces the same underwriting classes and, thus, mortality assumptions. Until they have credible experience to show otherwise, their best estimate will be the same as the traditionally underwritten business.

Another panelist suggested starting with an expected distribution. From there, use relative mortality assumptions for each underwriting class to calculate a weighted average mortality assumption relative to traditional underwriting. For example, an application that was given an accelerated offer that matched their traditional underwriting offer would be weighted with 100% mortality. An application given a better offer through an accelerated program would be weighted with the ratio of the two mortality assumptions. This type of methodology introduces all sorts of intra-class mortality subsidies if the only thing measured is the overall weighted average. There is significant regulatory risk in doing so.

Ideally, a company would undertake a retrospective calibration study or a live parallel test in which cases are underwritten under both the full underwriting and accelerated underwriting rules using all of the new tools and data sources that will be available once the accelerated underwriting program goes live. This allows for the development of a confusion matrix that illustrates the movement between traditional full underwriting risk classes and accelerated underwriting program risk classes. From this, estimate the mortality of the accelerated underwriting classes compared to the mortality of the full underwriting classes. With this approach, it is also necessary to take into consideration the additional misrepresentation that will occur in a live production environment that will not be reflected in the retrospective calibration study or the live parallel test, which is quite difficult. This additional loading may vary by company as some target markets, distribution channels, and marketing methods are more prone to this sort of behavior. Sensitivity testing can be useful to determine how much loading is reasonable (i.e., is the loading sufficient to cover a reasonable number of extra lying smokers and/or declines). Once in a live production environment, one would then compare the results of any pre-issue holdouts and post-issue monitoring to the assumptions made from the retrospective calibration study or the live parallel test to determine whether the level of misclassification and priced-for mortality slippage is still attainable and react.

It makes sense to group accelerated policies with non-accelerated policies within a given class. It was pointed out that the best class wasn’t segmented into multiple tiers today based on BMI or other items that drive mortality differences,

rather the subsidization occurring within the class was accepted. Splitting the mortality into best class accelerated and best class non-accelerated might even give a false sense of precision. The reality is the accelerated best class might have a little higher mortality due to non-disclosure that is missed, but this is offset by a little better mortality from the value of being more selective on other items in full underwriting. For example, accelerated underwriting might have a tighter BMI range than full underwriting, or need a better lifestyle score than full underwriting. There is some piece of information that was questionable enough for the algorithm to request full underwriting, which would increase mortality on the residual cohort that is sent to full underwriting.

One panelist stated the only way to demonstrate a revised mortality expectation to regulators was with sophisticated modeling, founded on medical research or mortality analysis.

3.4.2 Principle-Based Reserve Mortality Assumption

Panelists were asked what process they would take to determine the mortality assumption under Principle-Based Reserves (PBR) for business subject to accelerated underwriting, with the following results.

Summarized Panelist Responses

One panelist thought that, right now, there is no credibility, so industry tables might need to be used. The challenge is the accelerated underwriting programs are all different and not all companies would be willing to share the proprietary details of their algorithms, even if it might help them slightly with the reserves they would need to hold. However, the majority of companies would ultimately have fully credible experience for AUW business, which would be influential in setting the best estimate mortality assumption for accelerated underwriting programs, as they are the starting point to be adjusted. These adjustments to best estimate mortality would need to be explained for PBR, and then possibly an additional margin added to the accelerated underwriting mortality. However, for credibility purposes, many panelists expect accelerated underwriting and full underwriting experience to be grouped together. It would not be expected that every change to the underwriting program require a new credibility calculation.

One approach a panelist put forward to meet the requirements outlined in VM-20 Section 9.C.2.f was as follows. The guidance note may not have anticipated the evolution in accelerated underwriting programs when it stated that the use of this provision should be rare. For accelerated underwriting programs, where this may likely result in an increase to expected mortality, the approach should be considered a sufficient study based on medical research and company experience.

The panelist continues with a process that details documentation of the steps that could be provided to the regulator as a supplement to the company's mortality study as below:

- a) Calculate the Net Premium Reserve for accelerated underwritten policies using the prescribed CSO table.
- b) Map anticipated accelerated underwriting experience to an industry table using actuarial judgment and comparing mortality levels, as an alternative to the SOA Relative Risk Table.
- c) Determine whether accelerated underwriting meets the criteria for an "expected incremental change" to our traditional regular medical underwriting business per VM-20 Section 9.C.2.f, and whether VM-20 Section 9.C.4.b is met for calculating credibility in aggregate since mortality is generated using a predictive model in aggregate. For one panelist's case, they believed these requirements would be met. The spirit of the incremental change should be met and, with the current wording, there needs to be a published study.
- d) Determine the regular medical underwriting business mortality assumption for the upcoming year using several years of mortality data and a predictive modeling approach in aggregate.
- e) Smooth and adjust predictive mortality for reasonable relationships.

- f) Apply actual to expected (A/E) factors to traditional regular medical underwriting mortality rates to only base experience based on the last ten years of experience, as VM-20 requires no more than ten years of historical experience.
- g) Apply incremental mortality rates on specific business subsets due to additional incremental mortality expected beyond regular medical underwriting rates due to accelerated underwriting.
- h) Calculate credibility and sufficient data period in aggregate for both traditional and accelerated underwriting experience using one of the prescribed mortality credibility methods in VM-20.
- i) Add an additional margin specific to accelerated underwriting policies, which will be set based on sensitivity testing and actuarial judgment.
- j) For modeling PBR mortality, grade from company accelerated underwriting experience mortality + experience prescribed margin + additional margin from step (i) to industry accelerated underwriting mapped mortality from step (b) + industry prescribed margin. The grading timing and experience prescribed margin are based on the credibility and sufficient data period in step (h).
- k) In addition, retrospective mortality improvement is applied from the mortality table central year up until the valuation date (using internal company improvement factors for the experience assumption and industry improvement factors for the industry mapped assumption).

However, as another panelist pointed out, step (g) does not allow for the precision that would be necessary to calculate additional mortality loads for low-frequency, high-severity impairments that might sneak through full underwriting. The 'add load' approach leaves a lot of room for interpretation without analysis to back it up.

To the extent that an accelerated underwriting program is set up somewhat conservatively and managed to keep the mortality very close to the traditional underwriting level, reserves could be set through the use of a traditional underwriting assumption with adjustments applied on top per Section 9.c.2.f of VM-20 to reflect the expected incremental change due to the adoption of risk selection and underwriting practices different than the underlying company experience data. Adjustments and sensitivity testing ranges would initially be developed through the use of a retrospective calibration study or live parallel test results. As a suggested best practice, at least annually, one would review the results of the accelerated underwriting program monitoring, such as random holdouts and post-issue APSs (until the actual emerging experience is credible) to determine whether the previously anticipated experience is inadequate, and if so, adjust as necessary.

If the model is a triage model that only accelerates a portion of the business at certain risk classes, then an argument could be made to use one set of tables for all business, regardless of whether it was accelerated. If a significant portion of the business is accelerated (possibly >25%), then perhaps additional conservatism is needed to account for non-disclosure risk in mortality until the industry better understands this. One set of tables for all business is a reasonable approach. Given the subsidization that occurs within risk classes today, this is no different.

Other factors could include what other protective attributes the company has in its model. One panelist's company was looking closely at many models that identified the riskiest applicants rather than segment risks or found preferred cases. These could be based on credit, public data, Rx, or medical history. Factors could be applied to the mortality assumptions for some of these specific attributes.

Assuming the program is built using a population of recently underwritten applicants with true underwriting decisions, a relative mortality (or other mortality measure) could be calculated for each applicant and used to determine the average mortality for each predicted risk class by the program. This predicted risk class could then be compared to the target mortality for the business validation population. Again, this assumes that traditional underwriting is the gold standard.

Another panelist described an approach below that is rooted in data. It is also complimentary to program development. Building an accelerated underwriting program requires detailed data on recently underwritten applicants, so the building blocks are already there. This approach also allows for assumptions to vary based on the efficacy of the program, fostering innovation, and promoting competition. Here's a more detailed review of the process:

1. *Determine the most severe impairment for each applicant in the sample population*

This is typically available from the data captured by the underwriter for substandard/uninsurable lives. There may not be a major impairment for standard or better lives, but it is important to distinguish between smokers and non-smokers.

2. *Assign a relative mortality to each applicant*

For substandard lives, simply use the substandard rating.

For standard or better lives, either use a more granular risk model based on medical research (if available) or use the current average mortality for each risk class.

3. *Overweight the population towards impaired lives (adjust for loss of sentinel effect)*

Each applicant should be assigned a weighting that increases the prevalence of impairments due to the loss of the sentinel effect. This weighting should be grounded in data, but will require some judgment based on the target market.

4. *Compare decision mix and relative mortality*

Run each applicant through the accelerated underwriting program. Then, using the weightings from step 3, compare the accelerated underwriting decision to the true underwriting decision. Similarly, compare the weighted average relative mortality of each accelerated underwriting risk class to the true risk class.

It's best to develop the relative mortalities based on early durations. Wear-off adjustments can be made at the end based on the expected survival rates of misclassified substandard and uninsurable applicants. The relative mortalities can then be converted into net single premiums and level mortality multipliers as needed.

These are good suggestions for setting mortality under PBR, but it is evident that more work on this is needed.

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, and take longer to grade into traditional underwriting mortality. Refining underlying rules, along with knowledge gained from experience, could improve underwriting decisions and possibly overall mortality.

It may, in fact, turn out that those who do not innovate may be subject to anti-selection due to a drawn out underwriting process. They may end up experiencing higher mortality if all of the good risks tend towards products and companies that offer accelerated underwriting. They are also more likely to lose market share.

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 panelists who have provided permission to publish their names.

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Cheryl Johns <i>FLMI, FALU, CLU</i>
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Appendix A: 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. 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 distinguish accelerated underwriting from more traditional programs (traditional underwriting or simplified issue)?
3. What percentage of applicants do you believe will meet the necessary criteria to be underwritten using the accelerated method(s) versus traditional underwriting? Identify the key criteria that might impact this rate. (if this percentage varies by the underlying methods, please respond for each underlying method)
4. What percentage of life insurance applications will be submitted through accelerated underwriting instead of traditional underwriting in 5 years from now? 10 years from now?
5. In a traditional underwriting program, exceptions are often allowed. Is there similar 'exception' activity in an accelerated program and if so, please describe the types of exceptions you know are occurring, and how they might impact mortality experience?
6. Is the current structure of industry tables a good starting point in terms of slope of curve, length of select period, and table construction for mortality under accelerated underwriting? Please explain why or why not.
7. What potential risk exposures are created from the use of different types of accelerated underwriting programs?
8. What is the quality of data sources used in accelerated underwriting programs? How does the nature/quality of the data impact expected mortality?
9. How can the mortality assumptions under current VM-20 requirements be satisfied in light of the company's experience base for supporting reserves for accelerated underwritten business?
10. Are there any mortality risk markers currently identified with full underwriting processes that are more difficult to capture with accelerated underwriting processes? Examples may be tobacco use or healthy lifestyle?
11. Are there situations where accelerated underwriting is a poor substitute for traditional underwriting?

12. Given an underwriting distribution using full underwriting with Super Preferred / Preferred / Standard / Substandard / Decline of 30 / 40 / 20 / 7 / 3, how would you fill in the following table?
 (For example, of the 30% Super Preferred under traditional underwriting, what percent would be Super Preferred, Preferred, Standard ... under accelerated underwriting?)

		Accelerated Underwriting					Overall
		Super Preferred	Preferred	Standard	Substandard	Decline	
Traditional Underwriting	Super Preferred						30%
	Preferred						40%
	Standard						20%
	Substandard						7%
	Decline						3%
	Overall						100%

13. Do you anticipate the mortality that emerges from insurance business having used accelerated underwriting techniques to be the same as, better than, or more adverse than traditionally underwritten business? If better or more adverse, then by how much (0%, +5%, +10%, +15%, +20%, +25% and over)? Comment in aggregate, but also by risk characteristics (e.g., age band, size band, methodology, etc.) if possible.
14. How will emerging mortality experience be impacted by accelerated underwriting in policy years immediately after issue? In the long term?
15. How long do you believe it will take for accelerated underwritten mortality to grade into 100% of fully underwritten mortality (in years from policy issue)?
16. What types of data are used in accelerated underwriting? State the frequency of the following and add additional items that are missing.

Data Element	low/medium/high
prescription check	
Motor Vehicle Report	
Medical Information Bureau	
telephone interview	
electronic health records	
internet search	
criminal history	
credit profile	
financial data	
lifestyle data	
social media	
online questionnaire	
e-inspection report	
background check	
lifestyle data	
actual physical measurements	
application	
wearable devices	
other -	

17. In programs where fluids are not collected, is there a loss of the sentinel effect captured by fluids? In other words, will applicants “anti-select” because they know fluids are not being collected? If so, are there offsetting factors that counteract the loss of the sentinel effect?
18. How does the distribution channel impact the mortality assumption under accelerated underwriting?

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
Data Element	low/medium/high	low/medium/high
prescription check		
Medical Information Bureau application		
Motor Vehicle Report		
telephone interview		
credit profile		
financial data		
criminal history		
online questionnaire		
e-inspection report		
background check		
lifestyle data		
actual physical measurements		
internet search		
electronic health records		
social media		
wearable devices		
Post issue underwriting		
Attending Physician Statement		
Consumer marketing data		
Artificial Intelligence		
Demographic Data		
facial analytics		
Random holdouts		

2. For accelerated underwriting, our survey results to date indicate that companies will increase qualification percentages to an “upper bound” point where it starts to bring in worse risks and then curtail qualifications. There is also a “lower bound” point where too many customers may get upset about not qualifying. Do you agree? At what percentage are those points?

Agree (Yes/No)	Currently	In 10 years
“Upper bound” point where risks worsen and need to adjust		
“Lower bound” point where too many customers may get upset		

3. Fill in the and definitions below and the following table relating to mortality of accelerated underwriting versus fully underwritten:

Briefly define an accelerated underwriting program in terms of robustness/accuracy that is:

Above average –

Average –

Below average –

Provide input on how the different quality of accelerated underwriting programs compare to fully underwritten plans. For example, if you believe that an above average program will have similar slope, longer select period, 10 years to grade and 2% higher mortality, you would fill that in as shown below.

Accelerated Underwriting Program - Robustness/Accuracy	Slope of Curve			Length of Select Period			# of Years to Grade into Fully Underwritten	Mortality % Differential (+ if worse/- if better)
	Similar	Flatter	Steeper	Similar	Shorter	Longer		
Above Average	x					x	10	+2%
Average								
Below Average								

4. Fill in the following:

- a) What is the percentage of policies that would have been declined under full underwriting that would be accepted under an accelerated underwriting program? How much higher is the morality assumption for a declined policy versus an accepted one? For example, if you believe 15% of policies will be accepted that should have been declined with increased mortality of 250%, you would fill in as shown below:

Accelerated program	Percent	Increase in mortality
Above average	15%	250%
Average		
Below average		

- b) What is the percentage of policies that would have been declined under accelerated underwriting that would be accepted under a fully underwritten program? How much higher is the morality assumption for a declined policy versus an accepted one?

Accelerated program	Percent	Increase in mortality
Above average		
Average		
Below average		

5. To the extent these new accelerated programs are successful in attracting new customers and reaching the underinsured middle market, the demographic, life-style, and medical characteristics of these new customers may be different than historical life insurance customers, which could impact mortality results. What percent of the accelerated program customers are new customers (i.e., from a previously underinsured market) and what is their mortality expressed as a percentage of the historic fully underwritten customers?

Percent of new customers	
Relative mortality	

6. Identify the top three indicators used to measure the performance of an accelerated underwriting program. For each indicator, estimate how long it takes from the beginning of a new accelerated underwriting program until that indicator will produce a useful [or credible] result. How does the size and robustness of the program impact these results?

About The Society of Actuaries

The Society of Actuaries (SOA), formed in 1949, is one of the largest actuarial professional organizations in the world dedicated to serving more than 30,000 actuarial members and the public in the United States, Canada and worldwide. In line with the SOA Vision Statement, actuaries act as business leaders who develop and use mathematical models to measure and manage risk in support of financial security for individuals, organizations and the public.

The SOA supports actuaries and advances knowledge through research and education. As part of its work, the SOA seeks to inform public policy development and public understanding through research. The SOA aspires to be a trusted source of objective, data-driven research and analysis with an actuarial perspective for its members, industry, policymakers and the public. This distinct perspective comes from the SOA as an association of actuaries, who have a rigorous formal education and direct experience as practitioners as they perform applied research. The SOA also welcomes the opportunity to partner with other organizations in our work where appropriate.

The SOA has a history of working with public policymakers and regulators in developing historical experience studies and projection techniques as well as individual reports on health care, retirement and other topics. The SOA's research is intended to aid the work of policymakers and regulators and follow certain core principles:

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 positions or lobby specific policy proposals.

Quality: The SOA aspires to the highest ethical and quality standards in all of its research and analysis. Our research process is overseen by experienced actuaries and non-actuaries from a range of industry sectors and organizations. A rigorous peer-review process ensures the quality and integrity of our work.

Relevance: The SOA provides timely research on public policy issues. Our research advances actuarial knowledge while providing critical insights on key policy issues, and thereby provides value to stakeholders and decision makers.

Quantification: The SOA leverages the diverse skill sets of actuaries to provide research and findings that are driven by the best available data and methods. Actuaries use detailed modeling to analyze financial risk and provide distinct insight and quantification. Further, actuarial standards require transparency and the disclosure of the assumptions and analytic approach underlying the work.

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