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The Danger of Keeping it Too Simple with Digital Underwriting Evidence

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Key takeaways

- Fully evaluating the impact of digital underwriting evidence (DUE) on mortality outcomes is challenging because they most often rely on retrospective studies.
- A case study using electronic health records (EHR) reveals the dangers of a too-simplistic interpretation of DUE's impact on mortality outcomes.
- A simplistic interpretation of the study may suggest mortality savings of 38%; more detailed analysis estimates the mortality savings to be 14%–27%.

Introduction

Digital underwriting evidence (DUE) has become an invaluable tool for enhancing both the accuracy and efficiency of risk assessment processes. However, fully evaluating the impact of DUE on mortality outcomes presents significant challenges.

While prospective and longitudinal studies would yield the most reliable data, their complexity and duration often make them impractical for timely business decisions. As a result, organizations frequently rely on retrospective studies, using underwriting outcomes as proxies for mortality risk when considering the adoption of DUE or any innovative underwriting approach.

Although there appears to be a straightforward relationship between underwriting results and mortality risk, this association is complex and rests upon underlying assumptions. Relying too heavily on simplistic extrapolation from underwriting outcomes may lead to misinterpretation and unsound conclusions.

This paper presents a case study examining the nuanced relationship between underwriting outcomes and mortality risk, highlighting the risks of overly simplistic interpretations.

Case study overview

To what extent does integrating electronic health records (EHR) into current accelerated underwriting (AUW) change the actual and expected mortality? Answering that question is the focus of this analysis.

RGA conducted this investigation in partnership with two insurance carriers. Retrospective EHR data was collected for cases previously assessed under AUW. Each case was reevaluated based on either existing AUW criteria alone or AUW supplemented with EHR information. After excluding cases with underwriting outcomes as “need more information” and cases declined through AUW, 156 cases remained for analysis. By excluding AUW declined cases, the study focuses on assessing the value of EHR in AUW accepted cases.

Underwriting outcomes, whether based on AUW or EHR, fall into risk classes, including:

- Super preferred NT
- Preferred NT
- Standard NT
- Various table rating
- Various smoker rating
- Declined

Each outcome is associated with an expected mortality rate typically expressed as a relative risk (RR). For example, standard NT class has an assumed RR of one. The declined decision applies only to EHR decisions, as AUW declined cases are excluded.

Two ways to calculate mortality savings

Mortality savings are calculated by comparing AUW_RRs and EHR_RRs. AUW_RRs represent expected mortality rates for AUW, while EHR_RRs refer to expected mortality rates after integrating EHR data. In this case study, the overall ratio of EHR_RRs to AUW_RRs is 1.38.

There are two ways to convert this ratio into mortality savings:

1. $1.38 - 1 = 38\%$
2. $1 - 1/1.38 = 27\%$

The first approach indicates that AUW mortality is understated by 38%. The second shows that implementing EHR corresponds to a 27% reduction in mortality, as a result of a 38% increase in expected mortality. There are two key differences between these methodologies:

1. They employ different reference points. The first uses AUW+EHR as the baseline (100%) to emphasize increased AUW mortality, whereas the second takes AUW as the baseline (100%) to demonstrate the reduction in mortality after EHR implementation.
2. The first approach does not distinguish between actual mortality and expected mortality, whereas the second explicitly differentiates between the two.

Either of the two numbers, despite their differences, may be viewed as representing “mortality savings” and can be incorporated into protective value studies to illustrate the cost-benefit of EHR. Carefully understanding the distinctions between them is necessary for accurately interpreting cost-benefit analysis results.

The second approach is recommended. It treats the AUW as the 100% reference point, as it serves as the baseline for evaluating the incremental value of EHR. Accordingly, AUW should be designated as the reference in this context. In addition, the 38% is literally an increase of mortality expectation.

The road to more accurate results

From there, it is useful to identify the two main components contributing to total mortality savings:

1. Improved risk selection
2. Improved risk classification

Evaluating mortality savings from each factor involves applying different assumptions, which may result in varying levels of confidence on the assessed mortality savings.

Risk selection involves identifying individuals considered high risk for a “decline” decision. This process leads to a reduction in actual mortality by excluding high-risk individuals from the insurance pool.

In contrast, risk classification assigns cases to different categories without excluding any cases from the pool; therefore, it affects only expected mortality, not actual mortality. In life insurance, mortality is usually expressed as the actual-to-expected (AE) ratio. Mortality savings can occur through a reduction in actual mortality or an increase in mortality expectations, which are reflected in insurance premiums.

Calculated mortality savings from improved risk selection rely heavily on an assumption of actual mortality reduction. In the case study, 13 of the 156 cases accepted under AUW were declined based on consideration of EHR. The mortality impact of this risk selection depends on the actual mortality outcomes of these newly declined cases. Since underwriting decisions are used as proxies for mortality, it is assumed that the 13 individuals will experience the same mortality as all historically declined cases from full underwriting. This assumption is difficult to verify, creating uncertainty around the accuracy of mortality savings from it.

In contrast, mortality savings derived from enhanced risk classification do not depend on assumptions regarding changes in actual mortality rates. Enhanced risk stratification through EHR leads to mortality savings by accurately raising the expected mortality. This increase in mortality expectation reflects an increase in premium—a measurable adjustment, not an assumption.

This case study assessed the effects of risk classification by excluding the 13 newly declined cases. Among the remaining 143 accepted cases, the ratio of EHR_RR to AUW_RR was 1.17,

suggesting a 17% increase in expected mortality. Using AUW mortality as the baseline, the calculated mortality savings are $1 - 1/1.17 = 14\%$. This result demonstrates a 14% reduction in mortality, attributable to the 17% increase in mortality expectations.

The assessed mortality savings resulting from improved risk classification requires fewer unvetted assumptions. It serves as an objective measure of the EHR's effect through its impact on risk classification and related expectations. The findings indicate that EHR mortality savings are at least 14%.

Conclusion: Implications for underwriting

While a simplistic interpretation of the study may suggest mortality savings of 38%, further detailed analysis estimates the mortality savings to be 14%-27%, with the former being a conservative estimate and the latter a more optimistic scenario.

The primary purpose of this analysis is to further understand assumptions and calculations used to estimate the mortality impact of various underwriting changes, with a specific focus on implementation of EHRs. As such, the range of possible outcomes presented in this paper should not be viewed as universally applicable or representative of the mortality savings any particular carrier may realize. Unique aspects of each carrier's underwriting program and business, including marketing and distribution, product pricing, and evidence(s) used, may impact results. This would create variations in mortality savings from one carrier to another. Statistical credibility should also be considered in light of the limited size of the dataset used for this analysis.

Contact RGA today to explore which digital underwriting evidences are right for your business.