



TrueRisk[®] Life Population Study

A Study of TrueRisk[®] Life as a Mortality Predictor in the Contemporary United States Credit Active Population

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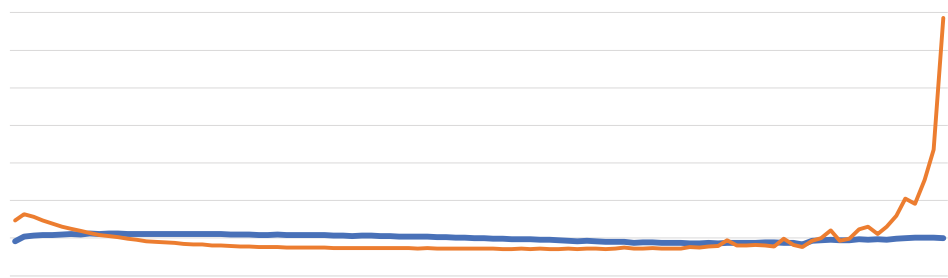
In 2013, Reinsurance Group of America (RGA) and TransUnion LLC (TransUnion) began to research the protective and predictive nature of credit behavior for the purpose of understanding relevance as it pertained to mortality risk. RGA's goal was to understand the relationship between credit attributes and mortality outcomes. Given credit data's successful implementation in analyzing risk in adjacent markets, like property and casualty insurance, it appeared to be an ideal behavior to explore for the life insurance market.

In 2014, a product version of a credit-based insurance score, TrueRisk® Life, was finalized by TransUnion. As discussed in the 2019 published article (Rushing, Kueker), RGA validated the newly created model by analyzing the risk score's ability to predict mortality in the credit active population. In the decade18.7 (h)-6.9 ()-1.5 (g).1 (u)-6 (a)(A)52.8rabe delcha3lany iog,rpekaaaare

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Figure 3: TrueRisk® Life Distributions at Entry by Cohort



the lowest scores. There was not attempt to adjust expected basis for these potential scenarios.

- **Scenario 1: Mortality**

TrueRisk® Life's performance has been shown to be age dependent, with the model achieving less segmentation for the oldest "entry ages." However, our previous understanding of this was limited to the original population study which only included entrants under 70. This updated study allows for the reliable analysis of people aged 70-79 at entry.

The data provided for study includes a TransUnion defined field indicating whether an individual has limited credit history (i.e., "thin" credit file), allowing for deeper analysis of TrueRisk® Life scores and corresponding mortality. While having a "thin file" is more common among younger people, the attribute appears across all ages.

The data includes a yearly TrueRisk® Life score for most records. This allows the year-over-year changes in scores to be understood and the corresponding impact on mortality to be analyzed.

A key motivation for completing an updated U.S. population study was to investigate how TrueRisk® Life performs in later study years. Previous analyses covered shorter periods (1999-2010), with 1999 as the only entry point. This study follows subjects for a longer period (1999-2020) and compares the performance of TrueRisk® Life across three different entry-years (Rushing, Kueker). Such a study set-up has allowed for a more complete assessment of TrueRisk® Life as a long-term predictor and offers insight into the score's value in 2022.

Figure 4: Actual to Expected Deaths by TrueRisk® Life Score

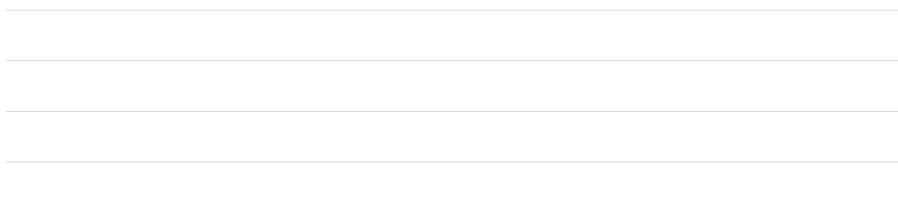
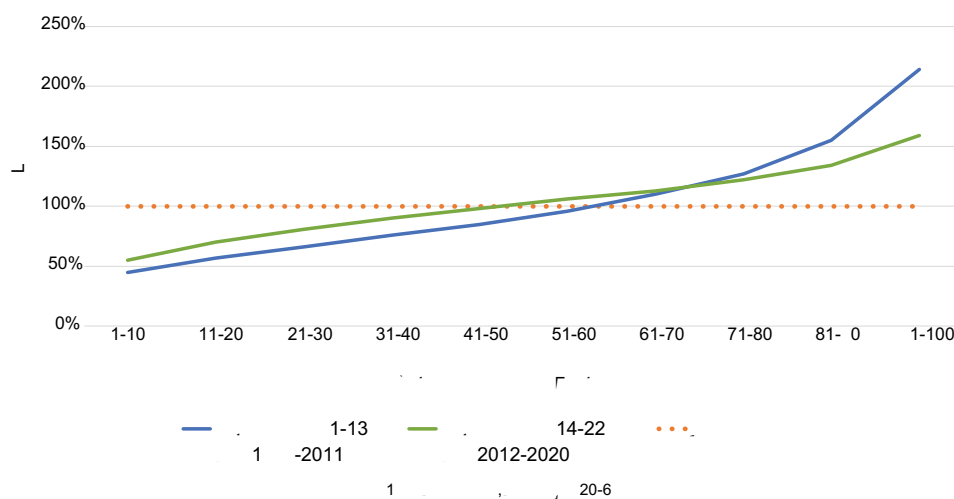


Figure 5: Actual to Expected Deaths by TrueRisk® Life Score and Follow-Up Period



When extending exposure to later study years, TrueRisk® Life retains most of its predictive power. Figure 5 compares risk segmentation in the first 13 study years and the remaining nine years of experience now available for analysis. As expected, some segmentation is lost in later study years. However, TrueRisk® Life is clearly predictive of mortality many years after scoring.

Figure 6: TrueRisk® Life Risk Segmentation by Study Year – Explanations for Falling Segmentation

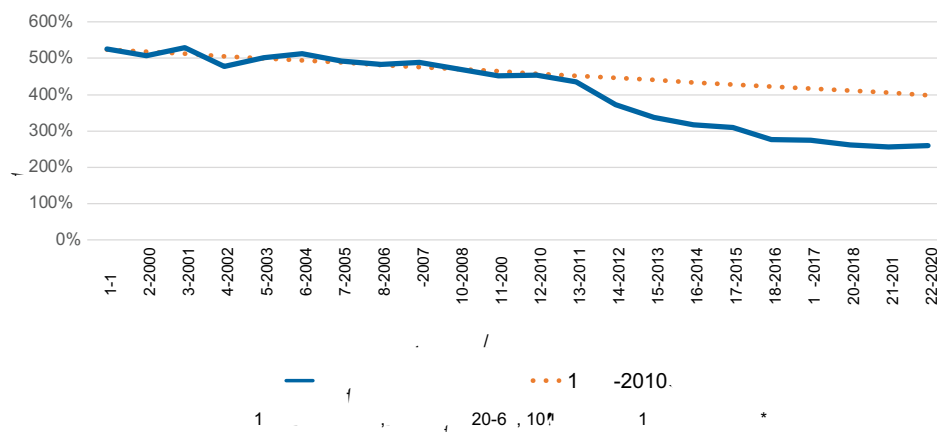


Figure 6 illustrates TrueRisk® Life's ability to distinguish the mortality of individuals with the "worst scores" (91-100) from the "best scores" (1-10) over time. The vertical axis is the ratio of the 91-100 group relative to the mortality of the e rat4 (a)-6.3 (t4 (a)-6.3 07 -1 (ve)-6.9 (r t)-18.e)-7.3 (s)15.3 f7 (i)86.3 (8(c)1 (o(r)-18 (l a)-14.8 (x)-14.9 (i)- (l (i)-16.8

Figure 7: Relative Mortality by TrueRisk® Life and Entry Year – 12 Year Follow Up

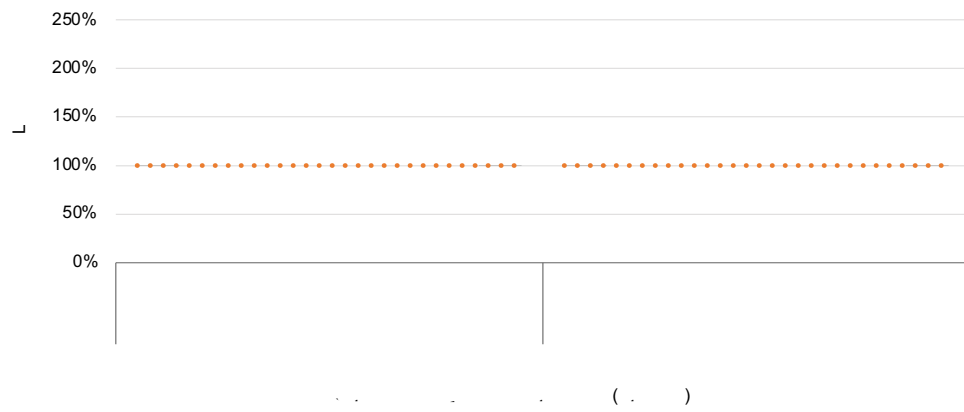


Figure 8: Distribution of TrueRisk® Life by Entry Age

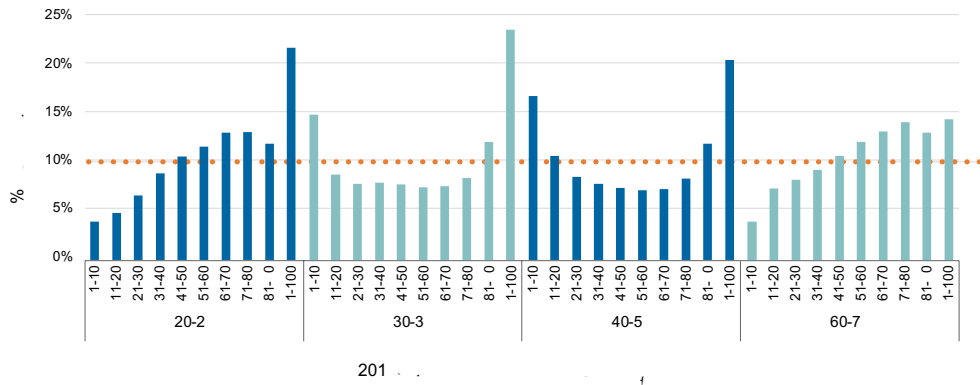


Figure 12: Distribution of Score Change – Four Year Follow Up – By Age



Figure 14: Actual to Expected Deaths by 2008 and 2012 TrueRisk® Life Scores



Figure 15: Percentage of “Thin Flag” by Entry Age

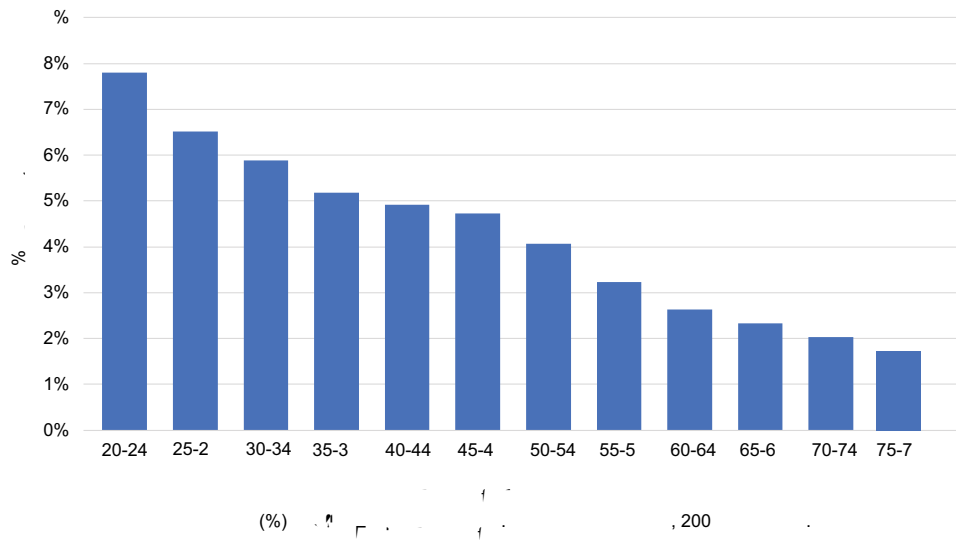


Figure 15 explores the relationship between age and prevalence of “thin credit history,” breaking down rates of the “thin flag” attribute. Older people are more likely to have an established history with a credit bureau and are consequently less likely to have a “thin flag.”

Figure 16: Distribution of “Thin Flag” by TrueRisk® Life Score

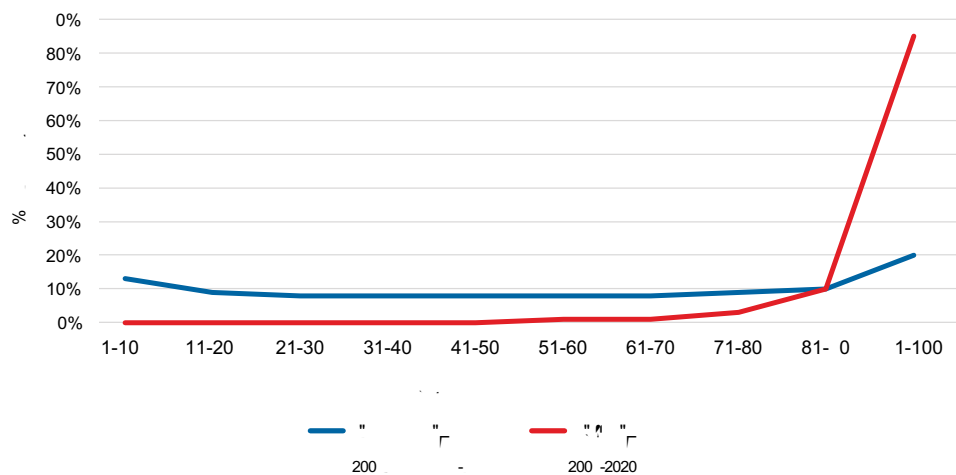


Figure 16 shows that when an individual has a thin credit history, they are over 80% likely to have a score between 91 and 100. It appears that a principal motive for an individual receiving a score of 91-100 is somehow associated with limited credit usage. However, of the records with a score of 91-100, only 18% were flagged with “thin credit history.” This suggests that there are many other drivers contributing to a very high score.

 Rushing, S., and Kueker, D. (2019, March 28). TransUnion's TrueRisk® Life: Creation and Validation of the Industry's Leading Credit-Based Insurance Score. rgare.com. Retrieved March 1, 2022, from
