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The Exponential Power of Structured Underwriting Data

An Actuary's Perspective, written by Hezhong (Mark) Ma

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The Exponential Power of Structured Underwriting Data: An Actuary's Perspective

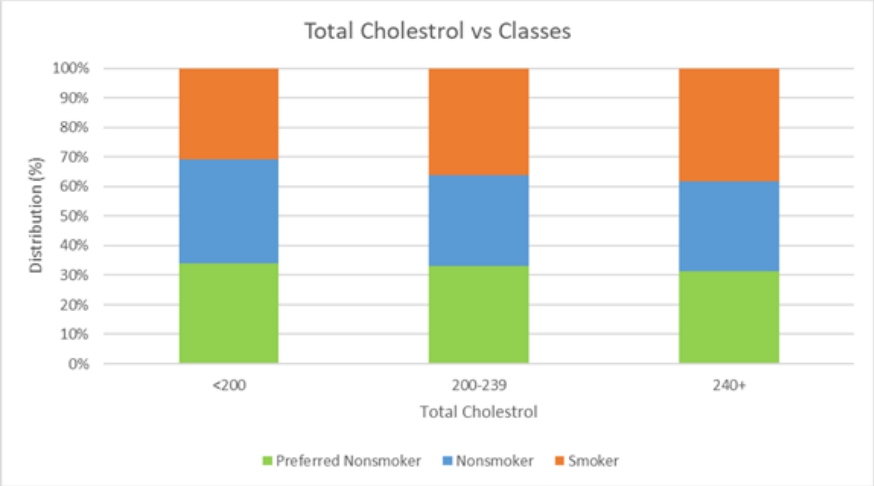
Both underwriters and actuaries claim decades of expertise in experience-driven risk assessment. However, there is often a disconnect between underwriting and actuarial systems. Underwriting evidence, impairments, and rationale behind decisions are typically locked within legacy underwriting systems, workbenches, and rules engines - often in unstructured formats. Only a limited set of codes is passed to administration systems and used by actuarial models. In the ten years that I have led underwriting analytics, I've lost count of how many times I've had to say, "That is a brilliant idea, but we just don't have the data."

RGA's partnership with DigitalOwl has fundamentally changed this equation.

DigitalOwl ingests volumes of unstructured and structured medical underwriting evidence and generates comprehensive summaries in PDF files and other structured formats, such as Excel and JSON files adhering to the HL7 v4 (FHIR) standard. These structured files include medical items, conditions, lab results, prescription histories, and key findings. DigitalOwl also offers an API integration option for users to interact with this detailed data, enabling machine-readable files for underwriting engines and workbenches, as well as tabular formats for research and analytics.

To date, RGA's in-force analysis has included approximately 26,000 underwriting files, over 5 million pages, processed by DigitalOwl and returned to RGA. In the first phase, these files were transferred via a customized process. Although this analysis is at an early stage, the potential is undeniable. The following exhibit illustrates the distribution of underwriting classes by the most recent total cholesterol measurement at the time of underwriting.

Exhibit 1 - Distribution of Classes by Total Cholesterol Count

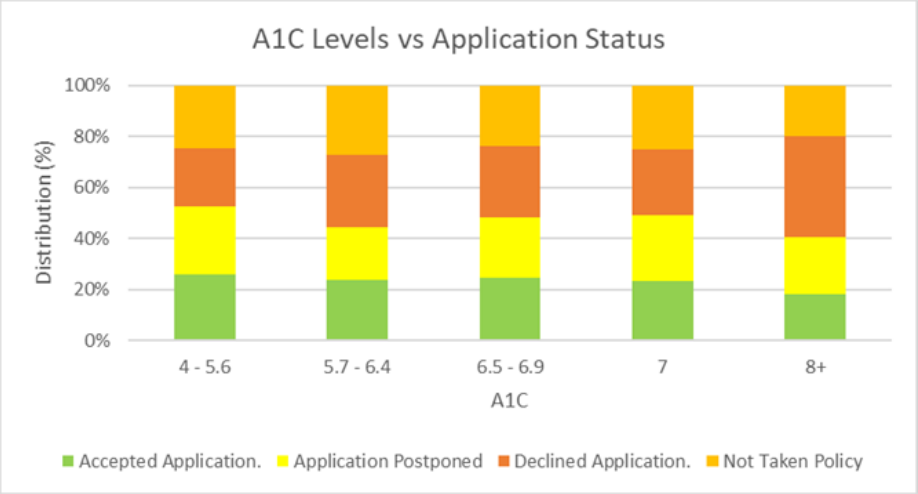


I can already anticipate my underwriter colleagues saying, "Cholesterol is only one of a million factors affecting a class!" Likewise, my fellow actuaries might argue that there is no clear pattern between these two variables. However, this misses the point: for the first time in our history, we now possess the data and capabilities to create charts like this. More importantly, we now have *longitudinal* data of vital signs and lab results like weight, blood pressure, and A1C, etc. which can be linked to variables in our administration systems and experience studies. This capability will allow us to explore the following types of scenarios: If we lower the cholesterol threshold for super-preferred, how many more people would qualify? Which point-in-time cholesterol value, or the pattern of changes, are most predictive of mortality?

While some companies may have captured insurance laboratory cholesterol values at the time of underwriting, virtually none would have captured every cholesterol value in the file. These granular insights can **refine underwriting manuals**, and when combined with rules engines, transform into actionable **rules or models**.

This machine-readable knowledge will **transform underwriting processes**. For instance, we can utilize structured underwriting data to identify cases more likely to be placed, therefore prioritizing valuable underwriting resources. Below is a chart of AIC level to application status.

Exhibit 2 – Distribution of Application Status by A1C



While this purely illustrative chart may not show a significant relationship, the integration of data like A1C levels with the thousands of other available data points can be programmed into your underwriting process to pre-fill impairment codes in a workbench, target certain cases for post-issue audits, or build accelerated monitoring programs. The possibilities are truly endless.

In recent years, we've seen a surge in new underwriting data, tools, models, and innovative uses of existing information. Many carriers have questioned how protective some of these tools really are. Traditional actuarial approaches, while based on credible data sets and thorough experience studies, often miss the rich context underwriters consider when evaluating a case. On the other hand, the underwriting approach provides a holistic view of application but lacks the scalability and credibility that data-driven methods offer. Our partnership with DigitalOwl enables **protective value analysis at scale, speed, and efficiency.** By submitting the same cases with different permutations of evidence, we can measure the exclusivity directly. As a proof of concept, we submitted a small number of cases twice: once with APS and EHR, and once with APS and insurance labs and Rx histories. We then compared the number of medical conditions each run captured.

Exhibit 3 – Impairments Captured

		APS/EHR	
		Yes	**No**
APS, insurance labs, and Rx	**Yes**	89%	1%
	No	10%	0%

Based on this very limited sample size, unsurprisingly, adding EHRs to APS appears to capture more impairments than adding insurance labs and Rx histories. As we scale underwriting files, we will target specific evidence types and precisely quantify their incremental value of capturing major impairments.

A data-driven approach often encounters skepticism. How can we reconcile digital risk-assessment with decades of underwriting experience? Many InsurTech companies with novel products struggle to place their digital evidence alongside traditional underwriting processes to pinpoint improvements, win trust, and enable carriers to move forward confidently. By structuring our natively imaged underwriting data files, we can **validate and reconcile** these new tools with established methods. Below is a confusion matrix comparing when DigitalOwl identified Type 2 diabetes mellitus versus RGA manual impairment codes.

Exhibit 4 – Confusion Matrix

	DigitalOwl		
RGA	**Y**	**N**	**Total**
Y	9%	2%	11%
N	5%	84%	89%
Total	14%	86%	100%

The rows represent whether RGA identified Type II diabetes in our underwriting system, and the columns indicate whether DigitalOwl did. For instance, in 5% of cases, DigitalOwl flagged an impairment that wasn't coded in our underwriting systems. While there are hypotheses for this mismatch – such as the purpose of capturing impairments in an internal system versus the purpose of APS summaries, etc. – the real breakthrough is our newly-found ability to explain these differences with accuracy and confidence.

We are just beginning to explore the potential of structured data. For the first time, we can combine underwriting and claims data, allowing us to leverage data analytics for **fraud detection and claim rescissions**. The structured underwriting data can also assist **in force management.** Since we extract the first mention date for each impairment, we can calculate the percentage of the population that develops conditions like diabetes over a period of time. That insight allows us targeting policies for term conversions or consumer engagement. It could also be instrumental to in force analysis and reporting.

At RGA, clients come to us for help with improving application questions, entering new markets, or leveraging new distribution channels. These tasks require significant judgement and experience. We are now building the industry's richest underwriting data asset that will allows clients **to test a wide array of hypotheses.** With RGA's broad client base, we can **customize** this analysis to address your most critical problem statements.

I would be the first to critique the numbers in this article. They are crude just serve as illustrative examples. But they also represent only a fraction of 1% of our historical underwriting files. Thus, we are only at the beginning of a transformation. The art of the possible lies in looking beyond current imperfections to the transformative potential that structured underwriting data can unlock. At the heart of underwriting transformation is the ability to automate with confidence. RGA aims to leverage relevant experience to reinvent the design of rules, models, and underwriting processes. This is our blueprint for the future.

Questions? Contact your RGA representative or Mark Ma at hma@rgare.com.