CARIBBEAN ACTUARIAL ASSOCIATION

BALANCING THE EQUATION
SHAPING A SUSTAINABLE FUTURE
THE 33rd ANNUAL CONFERENCE

# LIFE INSURANCE 2.0- CLICK, INSURE, REPEAT

# Moderator and Presenters

**Simone Brathwaite**

*Senior Principal at Oliver Wyman*

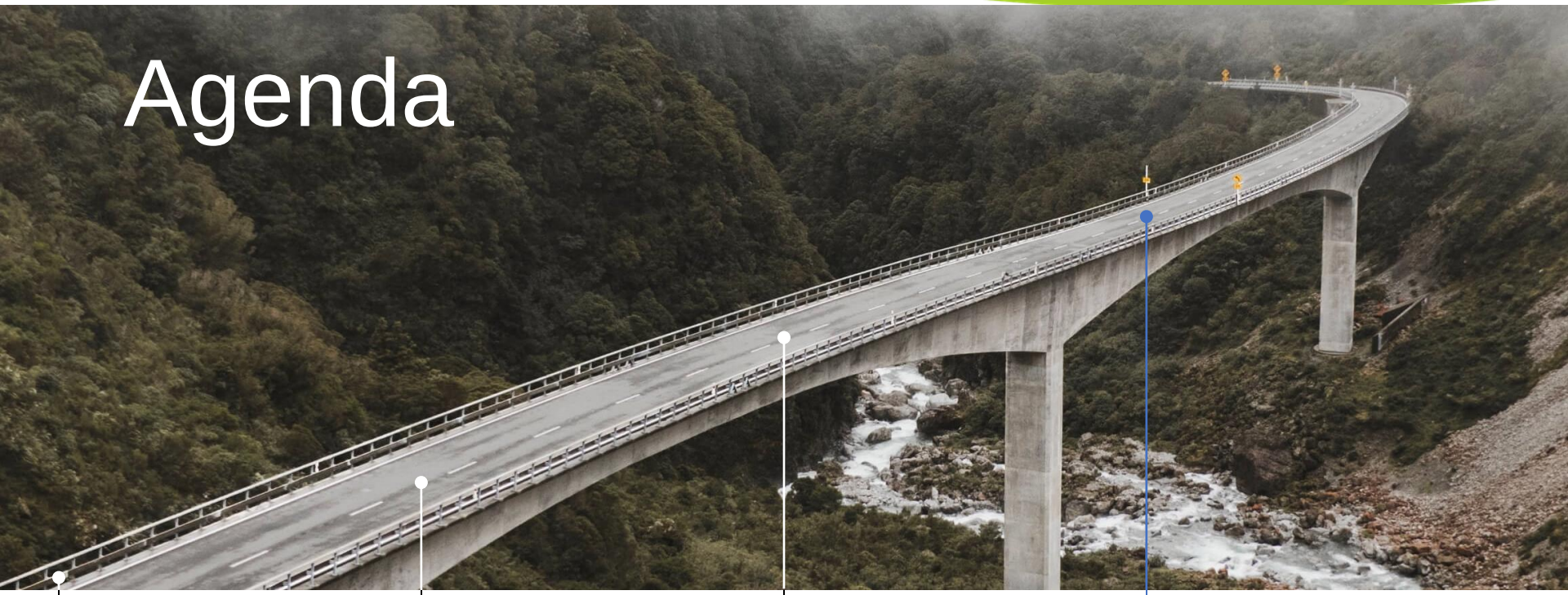
**Robert Soverall**

*Managing Director at Republic Life Insurance Company*

**Aadit Sheth**

*Manager at Oliver Wyman*

# Agenda



**1**

**Motivation behind the launched individual life insurance product**

**2**

**The changing spectrum of life insurance underwriting**

**3**

**Case study illustrating the linkage between mortality and non-traditional data**

**4**

**Live demo of the product and outlook for life insurance underwriting**

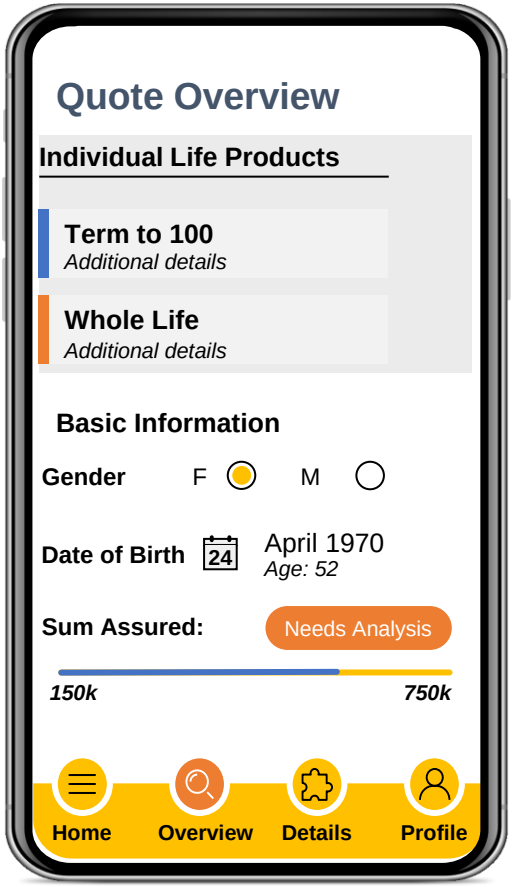
# 1

# Overview of the Product

# Motive and introduction of the individual life insurance product

| | |
|---|---|
| **1** | Enhancing customer-centricity by changing the narrative that “life insurance is sold and not bought” |
| **2** | Integrating societal purpose by targeting the significant under- and un-insured population |
| **3** | COVID-19 instigated the purchase and underwriting processed of life insurance |
| **4** | Embracing modernization, large amounts of data and advanced technologies to improve the overall customer experience |

# Key product features to satisfy the established motives




| | |
|---|---|
| **1** | Life insurance purchase journey is fully digital and customer purchase journey can be completed within minutes. |
| **2** | The e-platform provides simplified details on the products and provides users with a needs analysis. |
| **3** | The product is sold via a D2C channel to accelerate the shift towards digital distribution. |
| **4** | The products do not require traditional medical underwriting and is 100% fluid-less. |

# 2

# The Paradigm Shift to Accelerated UW

# Over the last decade, there has been a growing demand and shift towards accelerated underwriting

Simplified Issue and Accelerated UW are less invasive and quicker underwriting approaches

**Highest mortality risk**
**Least complex underwriting**

**Lowest mortality risk**
**Most complex underwriting**

## 1 Guaranteed Issue

- Easiest application as no medical exam required and no health questions required
- Usually very low face amounts covered
- **Highest mortality cost** associated with GI

## 2 Simplified Issue (SI)

- Handful of **medical questions**
- Accept or reject classification results in quick turn-around
- Faster issue relative to AUW and full UW, but higher mortality cost
- **No medical exam** and no fluids collected

## 3 Accelerated Underwriting (AUW)

- Modelled using predictive models and complex algorithms which **leverage several existing data sources** e.g. prescription history, credit scores.
- Potentially coupled with tele-interviews

## 4 Fully Underwritten

- Comprehensive application including a medical exam where **fluids are collected**
- Attending physician's statement (APS) is a common requirement
- Most intrusive/ invasive underwriting method
- Lowest mortality cost

The UW differentiation between SI and AUW is blurring.

# Why is AUW critical to life insurer success in today's market?

### Improved customer experience

- Customers are adopting to technology, but life insurers have historically been slow to adapt
- Underwriting and purchase of life insurance is viewed as "complex, time consuming and a lengthy handover" process
- AUW gets rid of invasive collection of fluids
- Increased persistency

### Lower operational costs

- Replacement of high-cost data sources such as lab reports, APS etc.
- Reduced need of human UW intervention
- Greater potential for direct marketing and sales

**Key Benefits of AUW**

### Quicker policy issuance

- Long processing times under traditional UW
- Younger population demanding instantaneous sales
- AUW offers a simplified process and allows for sales in minutes

### Enhanced risk management

- Insurers can better understand, predict and price risk using the abundance of available data
- Non-traditional variables can help stratify customers risk profile more precisely

# The next best alternative to readily available internal data is to consider external data sources for AUW

| Underwriting Tool/ Data | Description |
|---|---|
| Prescription history (Rx databases) | Drug utilization and pharmaceutical prescription database with historical records for applicants. Rules-based algorithms are developed using Rx databases and they are also used for electronic application verification. |
| MIB | Medical Information Bureau is database containing a list of all individuals who have previously applied for life insurance and health records related to an individual. Again, often used as a fraud-prevention database. |
| MVR | Motor vehicle records track driving history and any driving-related offences. Believed to be a strong correlation between driving habits and mortality. |
| Electronic application | Electronic application is the set of lifestyle and health questions answered by the applicant. This is often performed via a tele-interview. |
| Credit data | Credit scores and credit history data. The credit score can be mapped to historical experience relating credit scores and mortality. |
| Public record | Public record includes information related to bankruptcies, court records and any criminal activity. |
| Social media activity | A more niche set of data which insurers are beginning to consider. |
| Activity information from wearable devices | Some insurers use health and lifestyle related data from wearable devices for UW purposes. |

# Common terminology and metrics in the AUW paradigm

### Straight-through Processing (STP)

Ability for insurers to make a final underwriting decision in a streamlined and automated manner without manual/human intervention

### Random holdouts (RHO)

Pre-issue monitoring technique where an applicant is randomly elected for full traditional UW (despite being qualified under AUW)

### Mortality slippage

Critical metric for assessing AUW mortality against full traditional UW from RHO cases in the absence of credible mortality experience

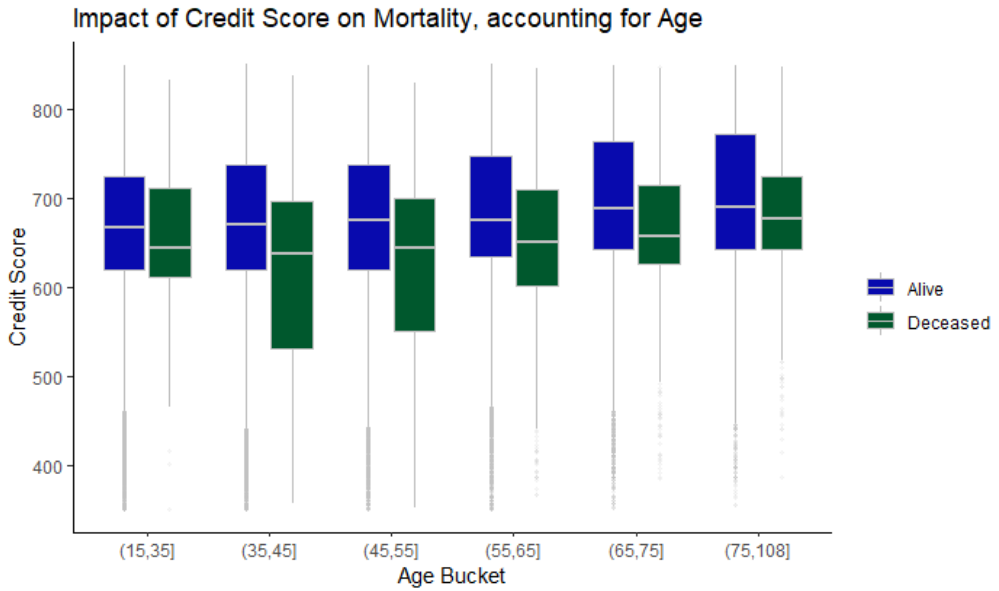
# 3

# Use Case: Linking credit scores and mortality

# An explicit correlation between credit scores and mortality can be deduced using the TU credit scores

There is a correlation between age and credit score as well, but having gauged this, we still see a relatively strong link between credit scores and mortality especially for the middle-aged populations

- Total dataset, once cleaned, includes **300k** customers. Out of the 300k records, we observe around **3k** deaths.
- The extract used for analysis and modeling contains the following key fields:
  - Primary ID
  - Sex
  - Age
  - Credit Score
  - Deceased Indicator
- The TransUnion credit score in Trinidad ranges from 150 to 950, with a lower score indicating a greater likelihood of delinquency.
- From our dataset, credit score follows a normal distribution with a mean CS of 675.



# A predictive model was built to illustrate the mortality signal from credit scores

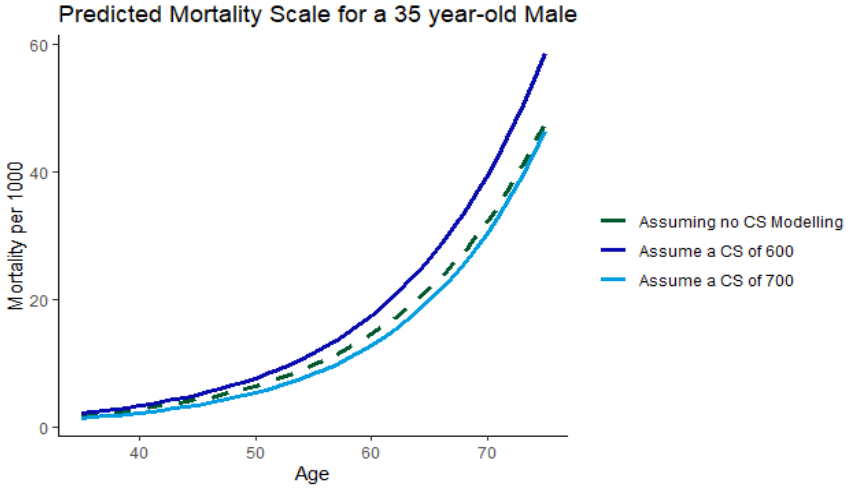
The aim of this exercise was to:

1. demonstrate how including credit scores can improve mortality prediction and
2. how a higher credit score can result in lower mortality cost, thus lower premiums

| Model | Variables included: | Area Under Curve (AUC[1]) | Log-Loss Metric[2] |
|---|---|---|---|
| 1 | **Sex** | 0.538 | 0.053 |
| 2 | Sex, **Attained Age** | 0.809 | 0.046 |
| 3 | Sex, Attained Age, **Credit Score** | 0.820 | 0.045 |

The predictive model produces a set of coefficients which allow one to predict the mortality, given a set of inputs. Using the incremental models, we compare the predicted probability of a 50-year old male with a credit score of 600 vs 700 dying within the next year:

| Model | Variables included: | $q_{50}$ CS = 600 (per 1000) | $q_{50}$ CS = 700 |
|---|---|---|---|
| 1 | **Sex (M)** | 12.24 | 12.24 |
| 2 | Sex (M), **Attained Age (50)** | 6.46 | 6.46 |
| 3 | Sex (M), Attained Age (50), **Credit Score** | **7.65** | **5.36** |



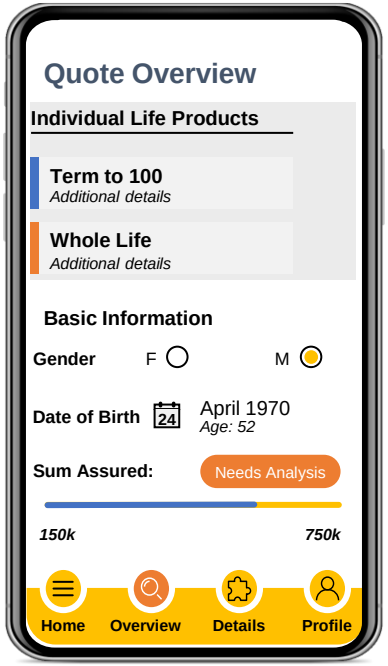

- The graph above illustrates the effectiveness of incorporating credit scores within the model for key ages. The relative importance is lower at the younger and older ages.
- Life expectancy (LE) differences for the 35 year old male vs Base (i.e., CS not included):
  - Modeling a CS of 700: increases LE by **0.67** years; equivalent to around 93% of the mortality in Base (**7% decrease**)
  - Modeling a CS of 600: decreases LE by **0.89** years; equivalent to around 110% of the mortality in Base (**10 % increase**)

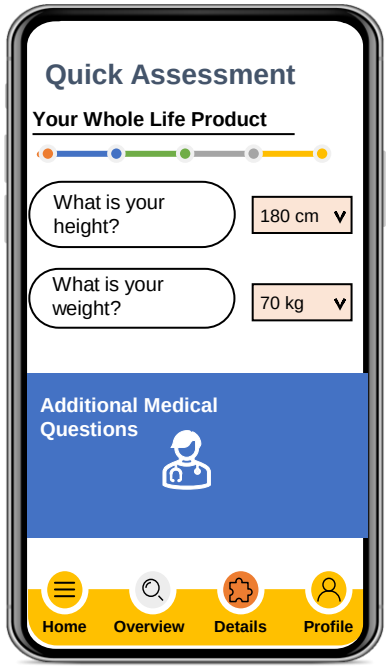
1. The Area Under Curve (AUC) metric is a common performance measure for classification models; the metric assesses how accurately the predictive model can distinguish between classes. The measure ranges from 0 to 1 and the higher the measure the better.
2. The log-loss metric is akin the AUC metric; it is indicative of how close the prediction probability is to the actual value (0 or 1). The less the predicted probability diverges from the actual value, the lower the log-loss value.

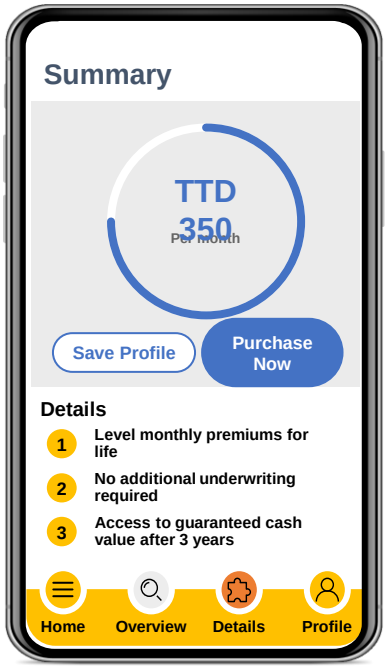
# 4

# Additional considerations and outlook for AUW

# Live demo illustrating customers can digitally purchase their life insurance policy within minutes



# Despite the advancements in recent years, streamlined underwriting is only the beginning of the innovation journey

2017 — 2022 — 2027

## Progress to date

- **Increased eligibility ages and maximum AUW face amount limits**
  - Average maximum eligibility age of 58
  - Average FA limit of around 1.8M (increased from 1M in 2018)
- **Around 70 to 80% of North American insurers offer some form of AUW option**
- **Electronic health records, prescription histories, motor vehicle records are commonly used data sources**
  - HumanAPI, MIB are examples of third-party data providers
- **Increased acceleration/ STP rates**
  - On average, around 70% of eligible applicants can be underwritten without human intervention
- **Increasing, but few number of risk classes and risk segmentation**
- **Larger amount of emerging mortality and persistency experience**

## Current and future advancements

- **Leveraging other non-traditional sources of data and advancements in technology**
  - technology that can detect pulse colour changes beneath the skin using a smartphone video camera in around 90 seconds
  - additional data sources such as lifestyle data, facial analytics etc.
- **Reduction in restrictiveness of AUW programs**
- **Increased risk segmentation**
  - Ensure premiums for “good risks” are lower than traditional UW
- **Increased product offerings**
- **Improved regulatory guidelines on usage of data**
- **Overall, increased sales and reduction in the underinsured population**

# THANK YOU