

# Life Underwriting – A New Paradigm

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# What we will cover





- Why now?
- New data
- Role of analytics
- What does it all mean?

# I. Why Now?





# Why is the underwriting paradigm changing now?





- Current process is not aligned with today's customer expectations – too long and arduous
- Current market is based on information gained from fluids and a multiple risk class product
- Risk management requires robust underwriting – two-year incontestability period
- New data and new technology offer new ways to get at the same price; lack of underwriting resources creates openness to change

# Digitization is the catalyst for the paradigm shift





# II. New Data





# The accelerated underwriting landscape shows how data is used today and what the future holds



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# Assessing new data: lifestyle, financial, demographic data

Credit activity Credit **Demographics** Lifestyle Home Accounts Fitness & exercise Max mortgage credit Age Year built # Student trades Hunting & shooting % Revolving trades Male Survey xxx vacations # Personal finance Avg payment auto Property size trades loans Family composition # Delinquent student trades Contest sweeps % Housing units % Households with # Installment trades % Derogatory detached xxx pet ownership mortgage trades Less likely to be a smoker More likely to be a smoker Mixed relationship with smoking



# Assessing new data: physical activity



Steps per day stratifies mortality risk

- People with sedentary/low steps per day have a higher mortality risk, while those with moderate/high steps per day have lower mortality risk
- People with sedentary behavior have 3x relative mortality of active individuals



# Physical activity and mortality

## Machine learning survival analysis



Model comparison - AUC

100.0





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# Electronic Health Records provide an alternative to APSs





# III. Role of Analytics





# Incorporating predictive models

**Concept:** Predictive models "learn" from historical data to score future cases



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# Value of evidence

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### Variable importance

With Fluids		Without Fluids	
Attribute	Source	Attribute	Source
BMI BMI (self-reported) Cotinine Issue age History of diabetes GGT Face amount Protein Glucose Gender	Labs App Labs Demo App Labs Demo Labs Labs Demo	Tobacco use Issue age BMI (self-reported) Face amount History of diabetes Gender Sales channel	App Demo App Demo Demo Demo

# Declined Smoker Preferred

Model accuracy comparison

Demographics only Demographics, Application Demographics, Application, Fluids

# Predicting underwriting outcome (protective value)

Objective: Employ predictive models constructed with and without key evidence (fluid testing) to identify segments where incremental value of evidence is minimal.

Smaller average distance suggests these segments can forgo fluid tests with minimal deterioration in mortality:

- Under xx years old
- BMIs ...
- No history of ..

### Data:

- Application
- Labs/exams

### Technique:

Gradient boosting with multinomial distribution, Tree



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# Managing misrepresentation

### Predict smokers

- Objective: underwriting triage
- Data: Application + US Census

### Example application:

- 1) Set cutoff to flag likely smokers amongst all applicants, about 20% of applicants
- 2) Model finds 19.5% of these applicants actually test for tobacco
- 3) Tobacco rate in remainder <7%
- 4) As misrepresentation rates increase, mortality savings from targeted testing are considerable.



# APS and predictive analytics

1) The APS provided the most useful information for modeling.



2) Various regression and machine learning techniques including random forest, gradient boosting and support vector machines applied to predict probability of decline.



- Besides probability, model provides keywords driving prediction along with page where found in text.
  - axillary: 12, 28, 30
  - prostate: 12, 56, 57
  - svc: 33
  - ancillary: 39, 40, 41, 43, 44
  - prostatic: 57, 61
  - influenza: 62, 63, 66
  - jaundice: 59
  - excised: 59, 61, 62
  - jaundiced: 68

# Predicting mortality – commercial scoring models



New 3rd party tools, such as

- LexisNexis Risk Classifier
- Transunion TrueRisk Life
- Milliman Rx Score

Relative A/E vs Milliman Rx Score by Drug Priority





Common applications include:

- Set threshold for eligibility into AUW
- Set threshold for cases that are Declined
- Set threshold for Preferred criteria
- Risk class shifting



# Predicting mortality – proprietary scoring models



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We can assign risk

model in similar

underwriting class.

and smoking status.

differentiation than

underwriting class.

It is clear that the model

classes have more A/E

proportions as

classes using the mortality

Model class assignment is

controlled for age, gender,

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# IV. What does it all mean?



What are the implications of all these changes

- We may have the same price but we will get to it in new ways
- We are looking at new dimensions of risk in addition to health
  - Activity
  - Responsibility
- The how in risk selection is as important as the what?
- Given new data and digitalization, we can track mortality at issue and beyond



Ultimately, how we price and monitor mortality risk will transform to a continuous process



