

**2019 Underwriting Issues & Innovation Seminar**  
**July 28-30, 2019**  
**Rosemont, IL**

**Deep Dive into New Underwriting Tools**

**Presenters:**

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[SOA Antitrust Disclaimer](#)

[SOA Presentation Disclaimer](#)

# Milliman IntelliScript Risk Score with Credit Data

SOA Underwriting Issues & Innovations Seminar  
Rosemont, IL

July 29, 2019



# Agenda

What is Risk Score?

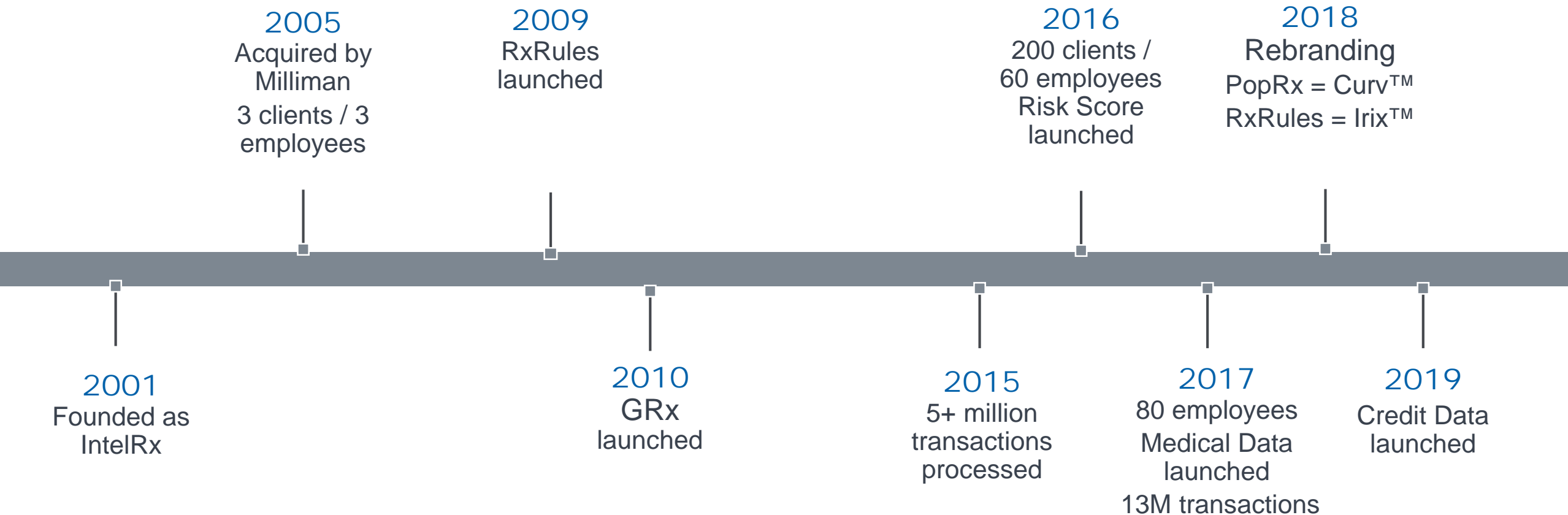
Introducing Risk Score w/ Credit Data

Simplified issue case study

Implementation hurdles



# IntelliScript History



# The Future of Underwriting ...

## Increasing

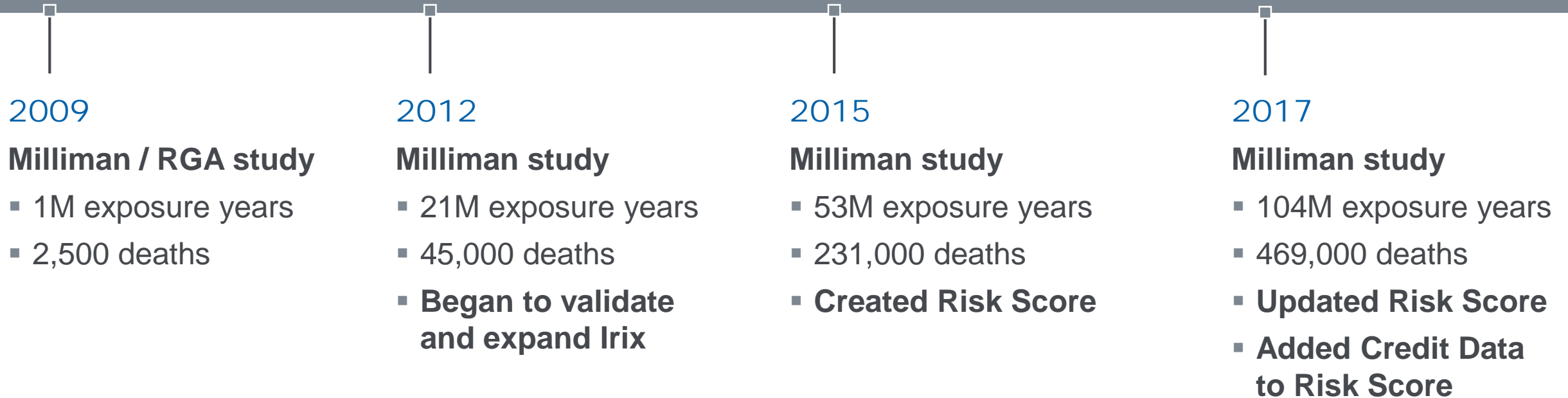
- Electronic requirements (Rx, Medical Data, MIB, MVR, Credit ...)
- Decision engines driven by data
- Predictive Models
- Automation

## Decreasing

- APS, Labs
- Cycle times
- Costs



# Mortality Study Timeline



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# What is Risk Score?

Holistic multi-variate model of mortality risk

Predicts relative mortality

Delivered within the Irix system

# Two different underwriting paradigms.

## Paradigms

### Clinical Underwriting

- Condition based
- Univariate
- Uses clinical expertise

### Predictive Model

- Statistical basis
- Multivariate analysis
- Single risk metric for each case



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## Predictive models like Risk Score have many benefits.

- Stratify risk within a given medical condition
- Evidence based and data driven
- Detect unintuitive patterns
- Quickly and consistently interpret large amounts of data
- Easy to test, implement, use, and update

# Risk Score inputs can include Rx + Credit or just Rx data.



# What kind of “credit data” are we talking about?

Types of Data	
Inquiries	Payment behavior
Number of accounts	Credit limits
Types of accounts	Collections
Outstanding amounts	Foreclosures
Derogatory marks	Bankruptcies

All data is FCRA compliant!

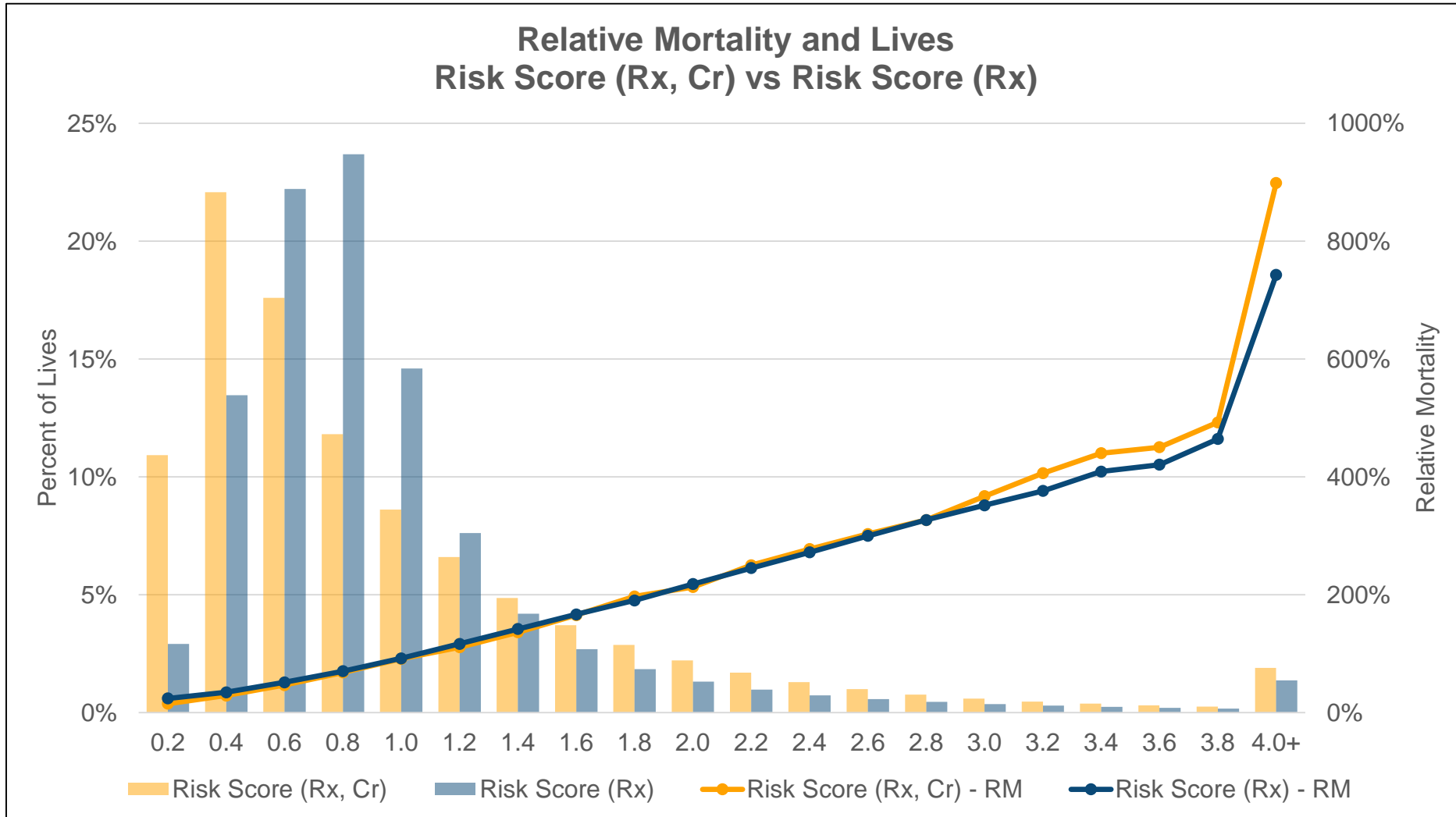
# What happens when only some data is found?



A score will be returned wherever data is found.

- 1) Both Rx data and credit data are found
- 2) Only Rx data is found
- 3) Only credit data is found

# Risk Score effectively predicts mortality.



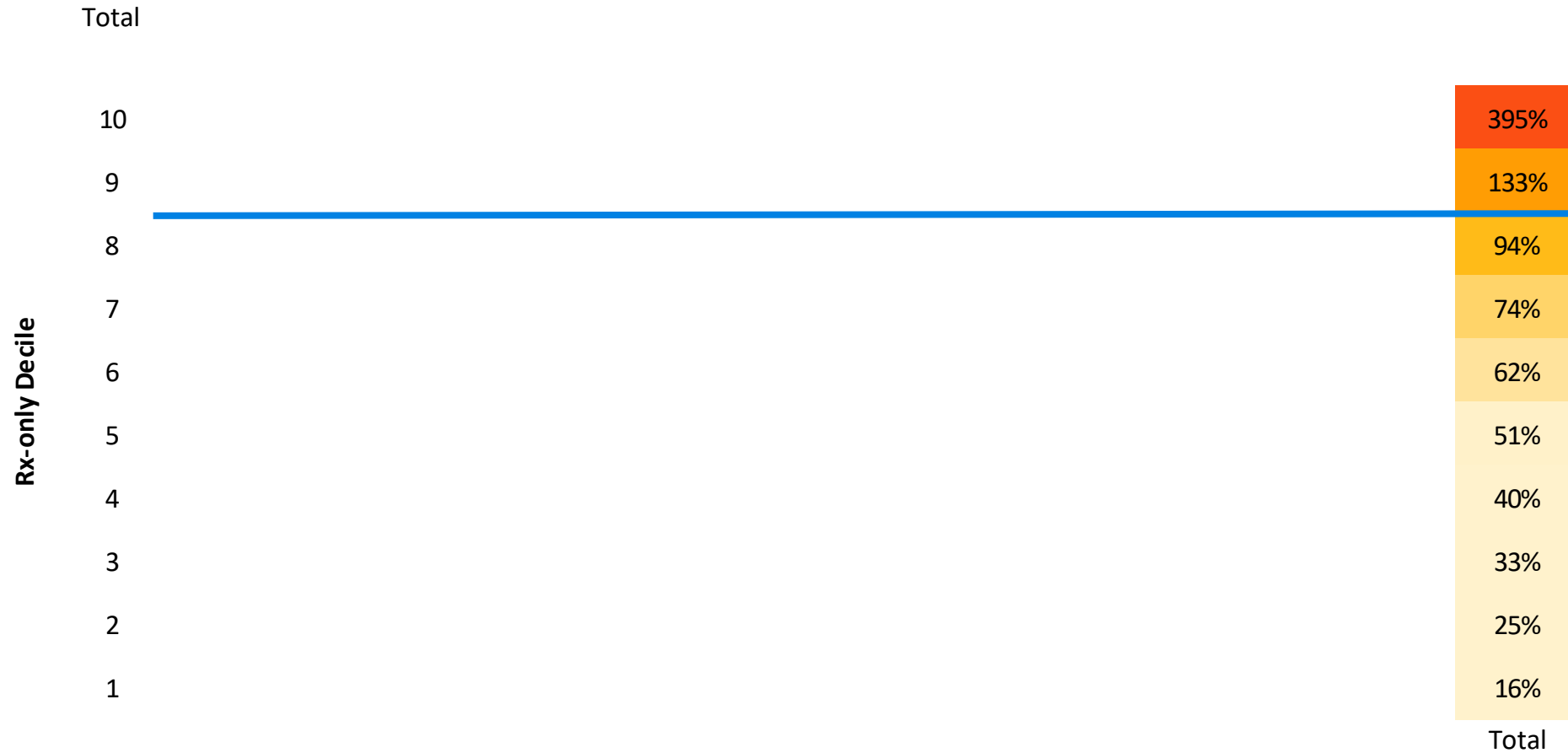
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## Why is a combined model superior to two separate models?

- Rx and credit data both stratify mortality risk in isolation
- Bringing the two together allows for more accurate risk assessments
- Interactions between the data elements uncover new insights

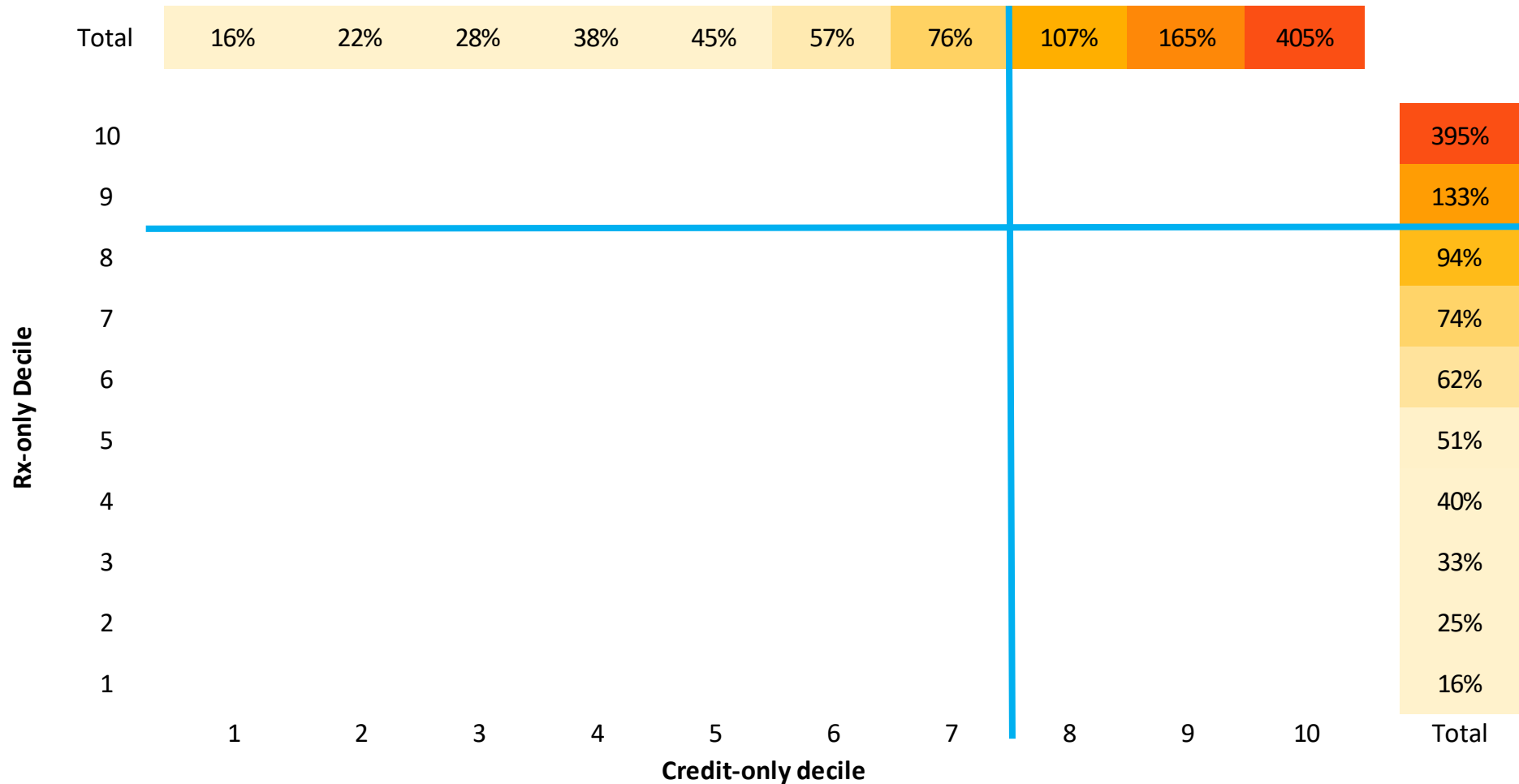
# Using two separate models may lead to missed opportunities.

Relative Mortality Cross Stratification by Rx-only decile and Credit-only deciles



# Using two separate models may lead to missed opportunities.

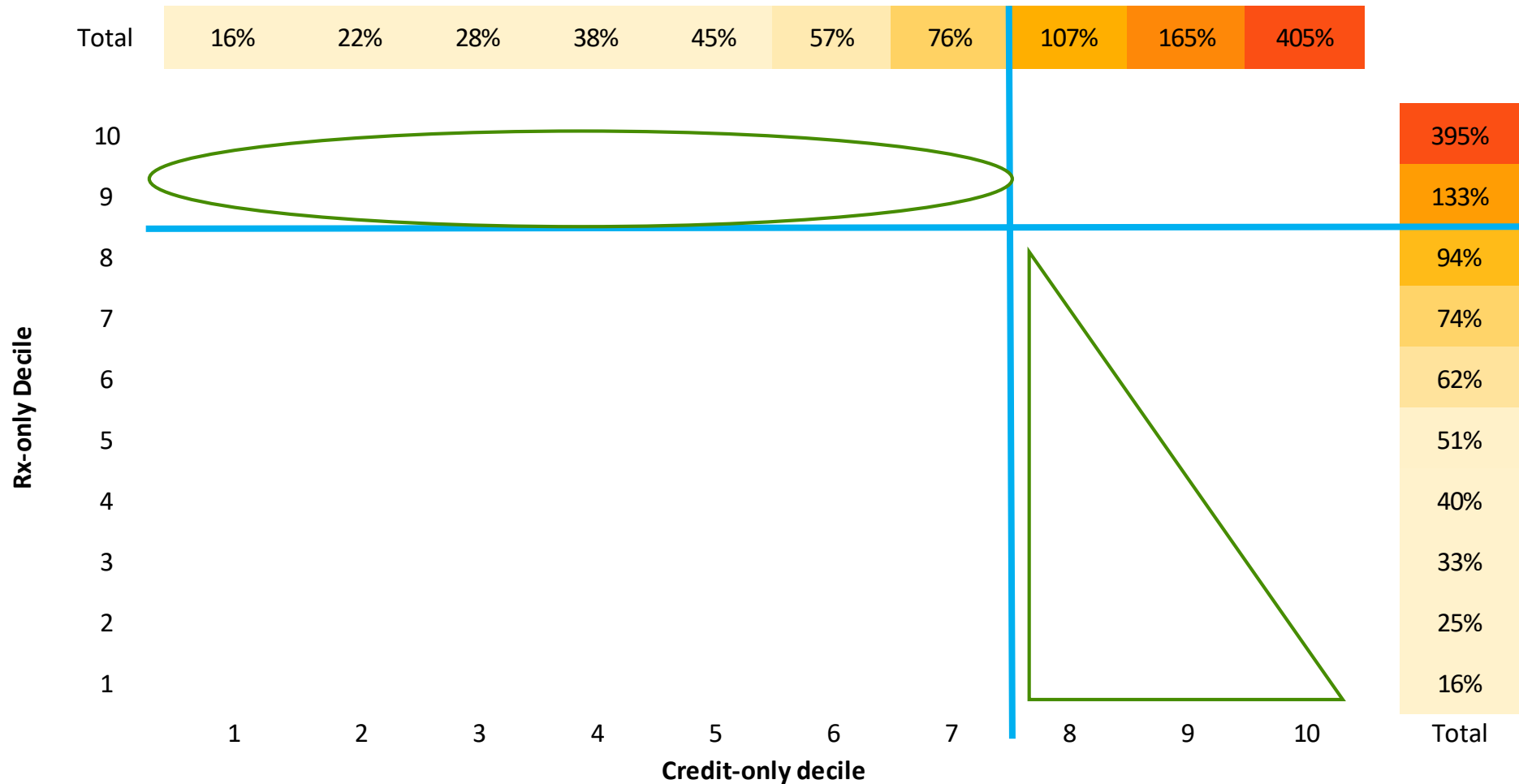
Relative Mortality Cross Stratification by Rx-only decile and Credit-only deciles





# Using two separate models may lead to missed opportunities.

Relative Mortality Cross Stratification by Rx-only decile and Credit-only deciles



# Using two separate models may lead to missed opportunities.

Relative Mortality Cross Stratification by Rx-only decile and Credit-only deciles

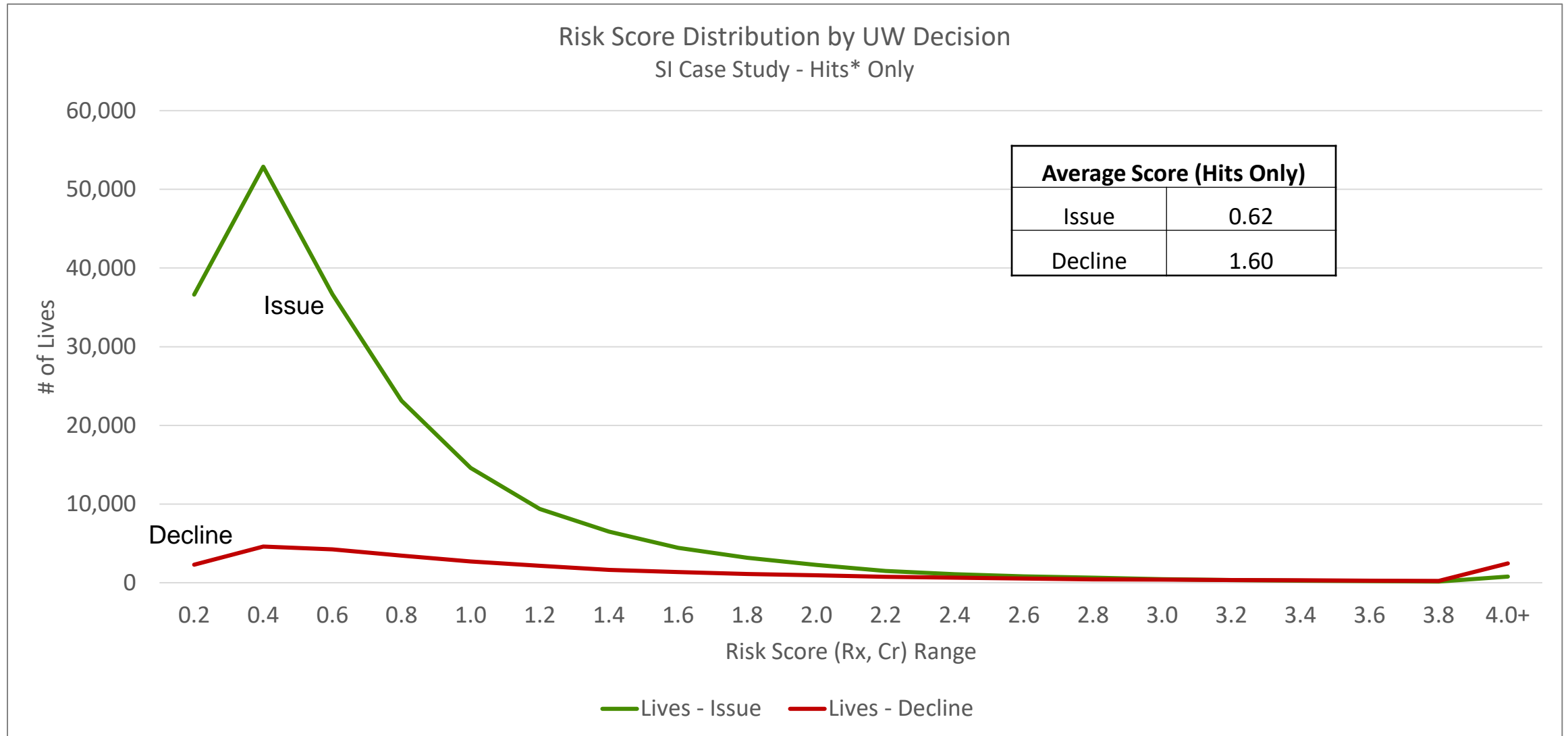
	Credit-only decile							Credit-only decile			
	1	2	3	4	5	6	7	8	9	10	Total
Total	16%	22%	28%	38%	45%	57%	76%	107%	165%	405%	
10	119%	162%	166%	180%	207%	207%	247%	297%	394%	802%	395%
9	42%	40%	46%	60%	63%	86%	89%	119%	168%	341%	133%
8	27%	28%	31%	49%	44%	55%	69%	96%	127%	288%	94%
7	17%	24%	24%	29%	37%	48%	64%	74%	109%	260%	74%
6	17%	20%	26%	34%	36%	38%	60%	68%	94%	210%	62%
5	16%	19%	19%	28%	25%	38%	43%	65%	92%	191%	51%
4	10%	14%	18%	23%	27%	33%	38%	56%	76%	156%	40%
3	9%	12%	20%	19%	24%	30%	37%	47%	59%	136%	33%
2	10%	11%	15%	20%	22%	21%	32%	36%	49%	95%	25%
1	8%	8%	9%	14%	17%	20%	25%	26%	41%	63%	16%

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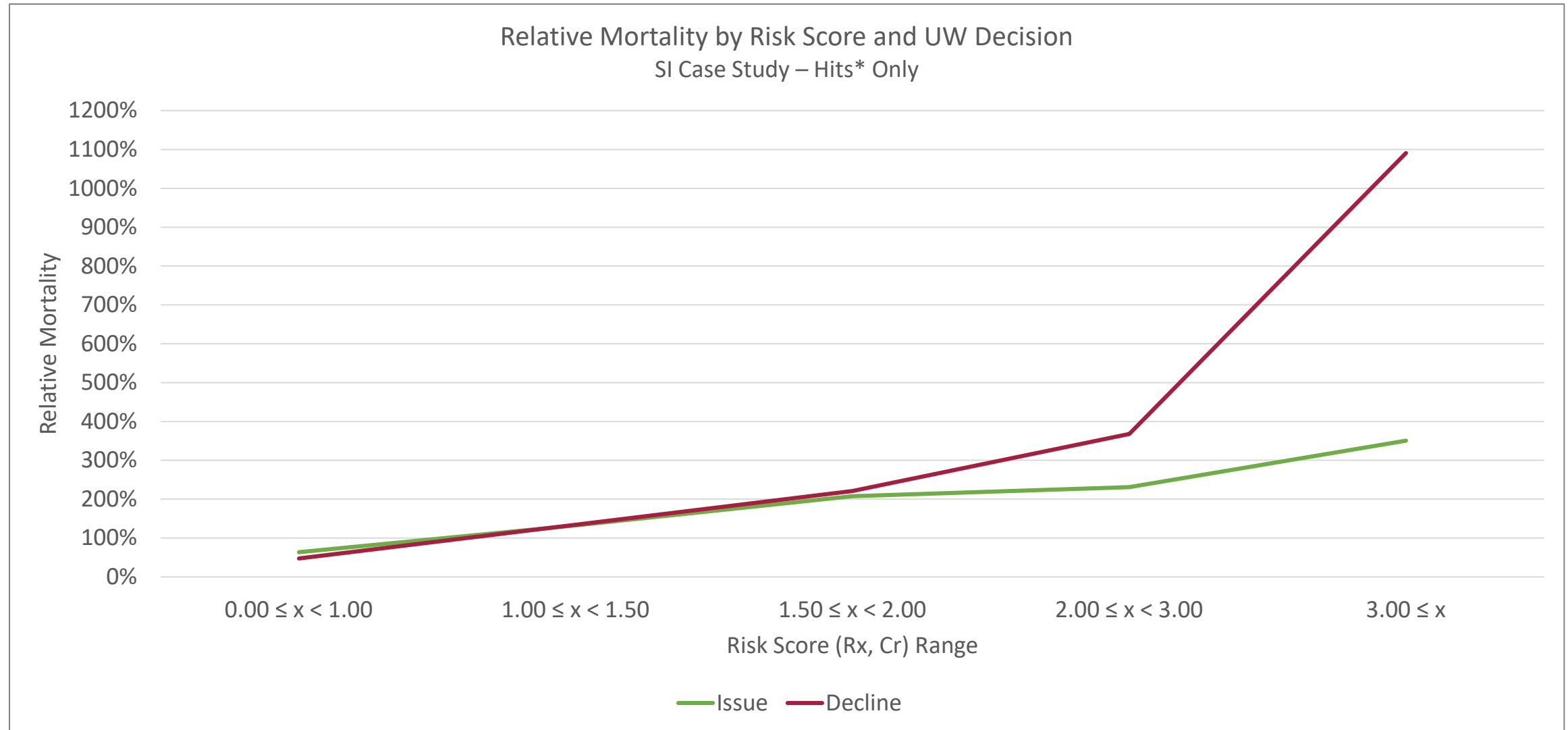
# SI Case Study – Background

- Mostly auto-decision via Irix
- Risk Score as of time of underwriting
- Have deaths on issued **and declined** cases

# SI Case Study – Distribution of Lives

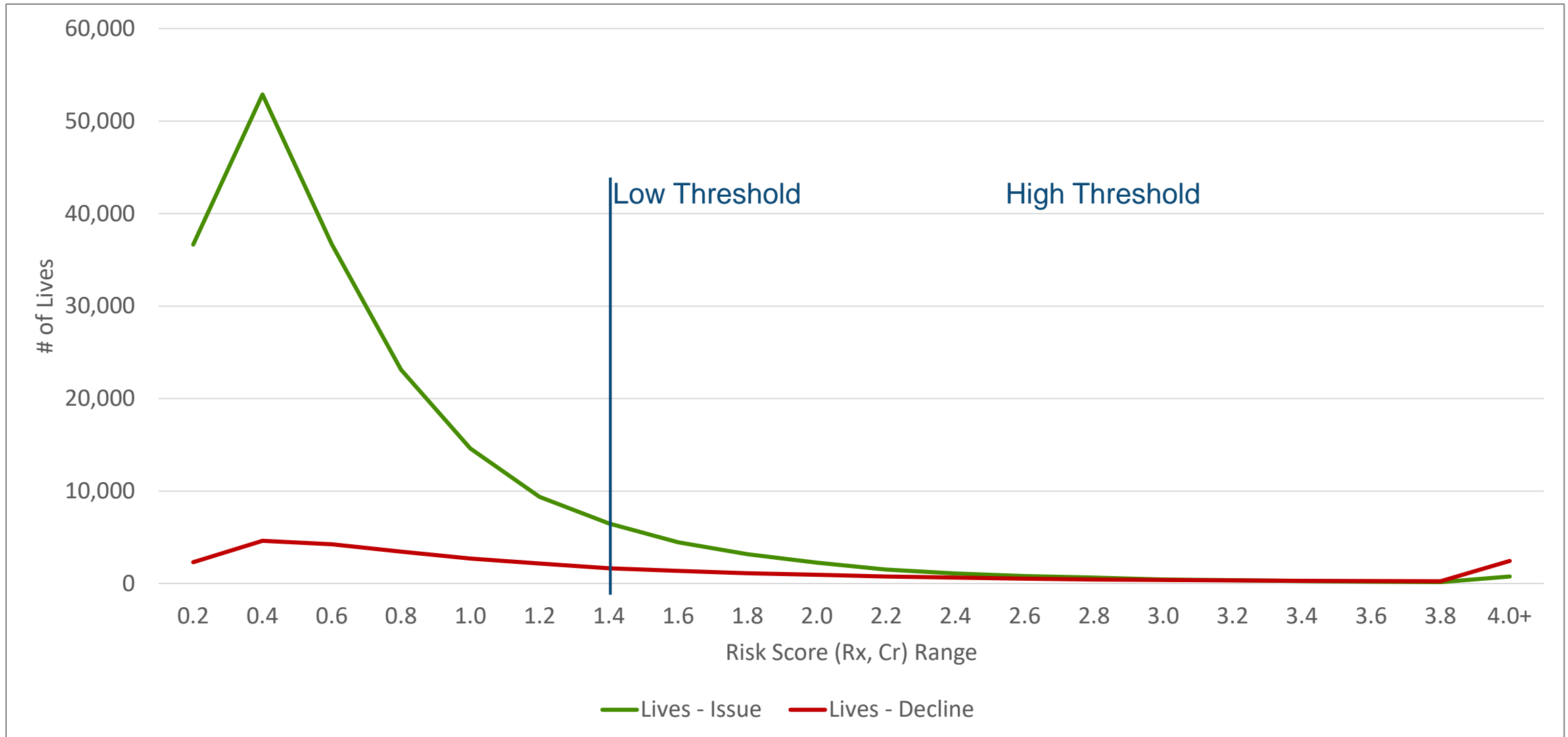


# SI Case Study - Relative Mortality



\*Hit = Rx hit or Credit Hit

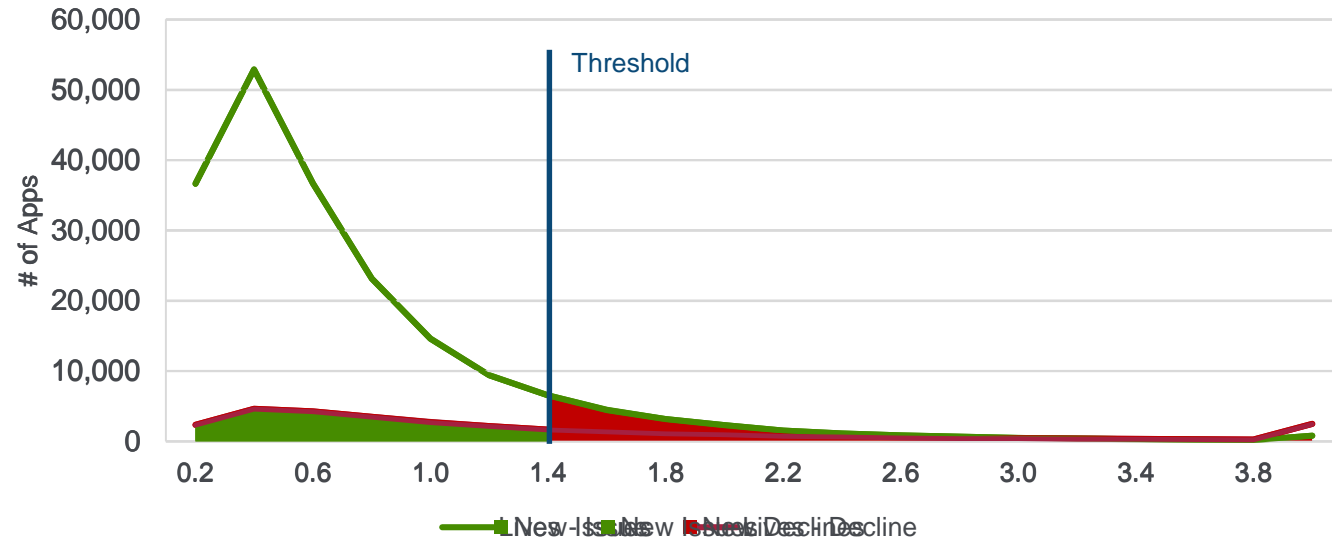
# Thresholds can be adjusted to achieve desired business results.



\*Hit = Rx hit or Credit Hit

# Set Risk Score threshold to issue the same amount of business.

- Some declined premium now gets issued
- Equal amount of issued premium now gets declined



Issued Cases Relative A/E	
Before Risk Score w/ Credit	After Risk Score w/ Credit
82%	71%

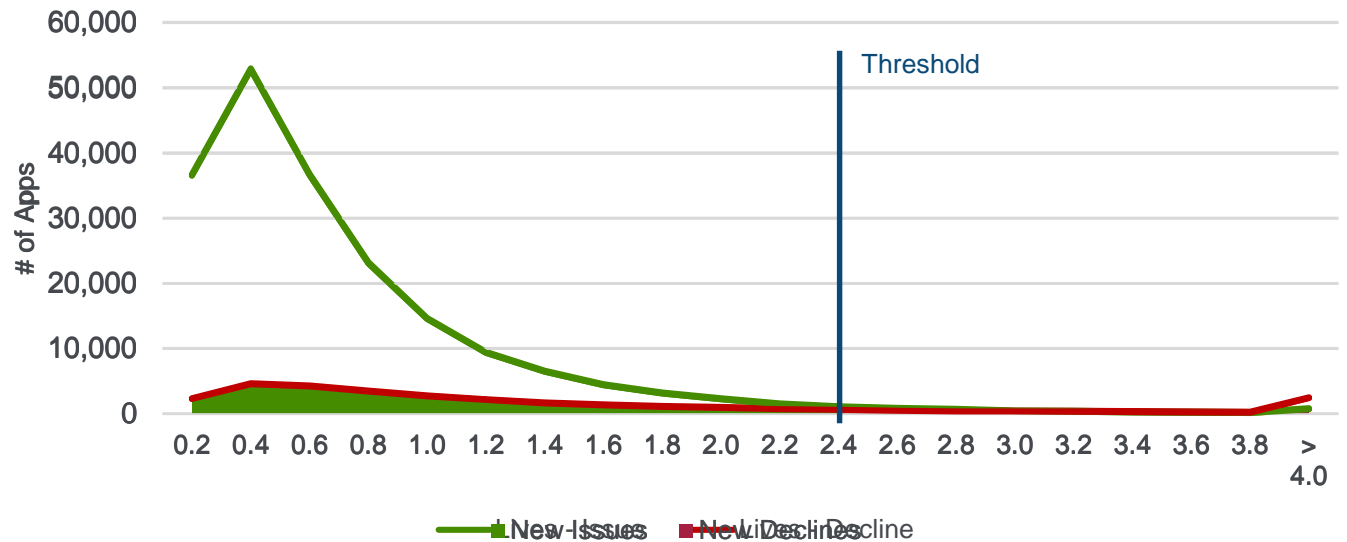
Same amount of business issued

12% Mortality improvement

\$13.7 Million increase in profit

# Set Risk Score threshold to maintain the same mortality A/E.

- Much of the declined premium now gets issued
- Less of the issued premium now gets declined



Premium Issued	
Before Risk Score w/ Credit	After Risk Score w/ Credit
\$115.5M	\$129.9M

Same mortality A/E

12% More issued business

\$14.4 Million increase in premium



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# Implementation Considerations

- Threshold Setting
  - With retrospective study vs. without
- Operational challenges
  - Change in underwriting
  - Field underwriting more difficult
  - Carrier / agent communication challenges
- NY Circular Letter



**Thank you!**



**RGA**

**RiskDimensions<sup>SM</sup>**  
**Digital Health Data Scoring**

**Dianne Schuetz**

VP, Business Initiatives, U.S. Markets, RGA

07.29.2019



- 
- **New Opportunity, New Challenge**
  - Purpose-Built Industry Solution
  - Practical Applications



# What is Digital Health Data (DHD)?

## Electronic clinical & claims data



CLAIMS DATA



DIAGNOSES



RX



PROCEDURES

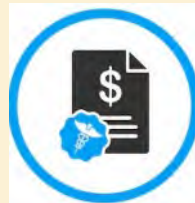


TESTS



LABS

## Obtained from a variety of digital health sources



HEALTHCARE  
PAYERS & PBMs



HEALTHCARE  
PROVIDER EHR



HEALTH INFO  
EXCHANGES (HIEs)



CONSUMER  
HEALTH PORTALS

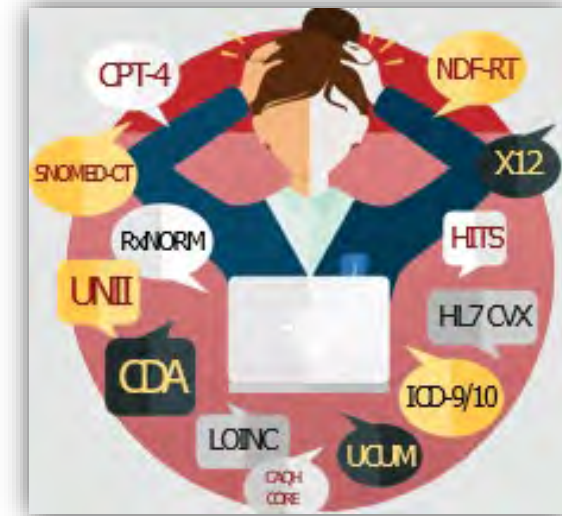


AGGREGATORS

# Why Score?

**DHD is complex with hundreds of thousands of codes**

Code Category	Code Sets	Total Code Volume
Drugs	RxNorm; NDC	625,000+
Labs	LOINC	85,000+
Procedures	ICD-9-PCS; HCPCS/CPT; ICD-10-PCS	100,000+
Diagnoses	ICD-9; ICD-10; SNOMED-CT	420,000+



**Multiple medical vocabularies** in the form of codes and code sets must be carefully dissected and understood.

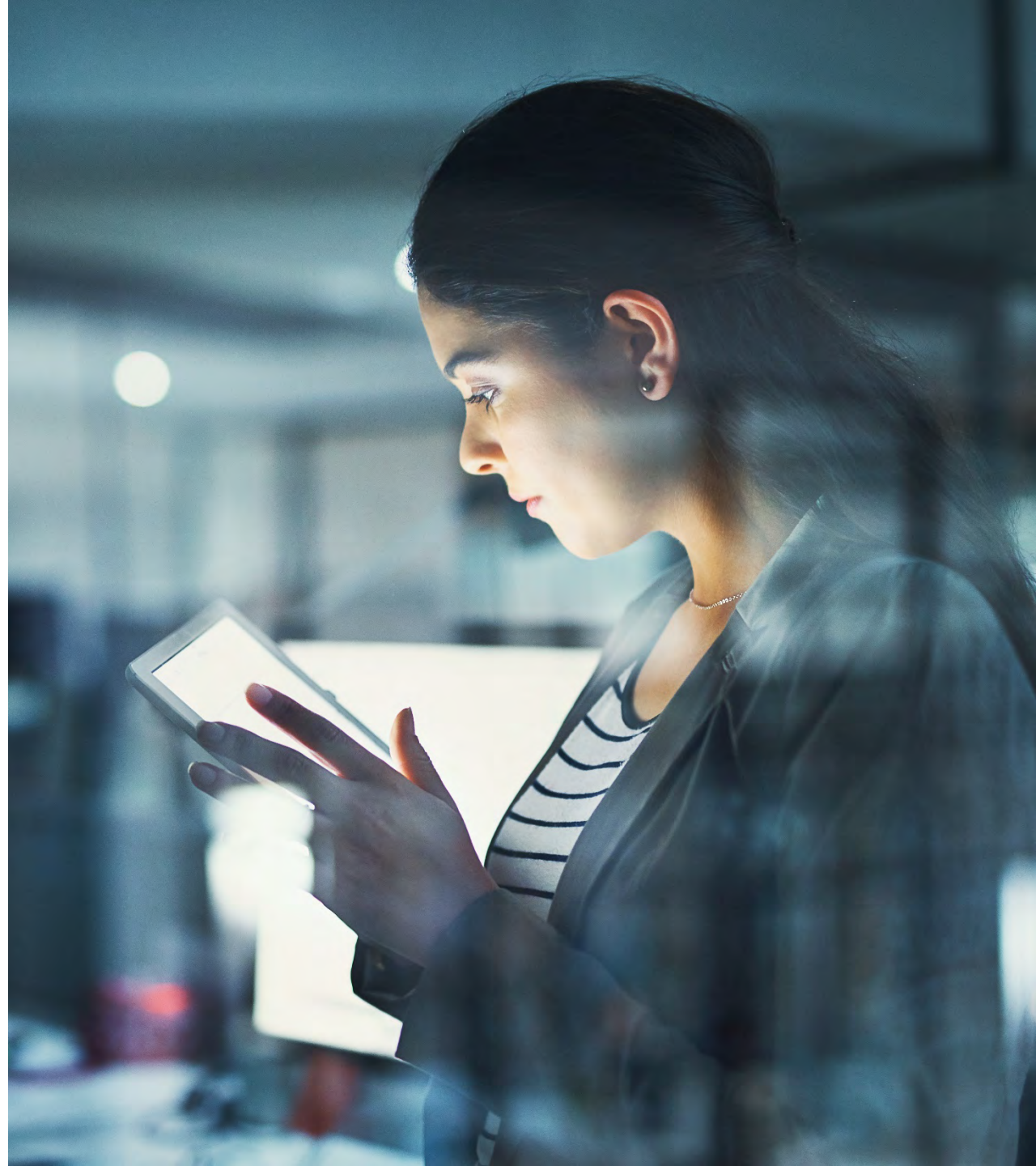
**Effective underwriting with DHD requires a deep understanding of risk associated with each code and group of codes**

# Our Favorites

- **V95.43XS:** Spacecraft collision injuring occupant, sequela.
- **220947004:** Bitten or struck by crocodile or alligator, occurrence on street or highway (event).
- **W59.22XD** Struck by turtle, subsequent encounter.
- **V97.33XD:** Sucked into jet engine, subsequent encounter.
- **W56.21X:** Bitten by Orca.
- **Z63.1:** Problems in relationship with in-laws.
- **W61.43:** Pecked by a turkey.
- **Y93.D1:** Injured while knitting or crocheting.
- **Z56.4:** Discord with boss and workmates.

# RGA

- 
- New Opportunity, New Challenge
  - **Purpose-Built Industry Solution**
  - Practical Applications





# Digital Health Data Transformation

- Consumes structured clinical and claims data
- Evaluates and assigns an underwriting score
- Transforms complex and massive amounts of data into actionable underwriting information



- Infrastructure purpose-built for DHD management
- Real-time access via a simple application programming interface
- Agnostic to data source

**RGA leverages underwriting expertise to transform digital health data**

# An Industry Solution

Transforming data into actionable underwriting insights



# Managing Code Sets

The screenshot shows the DHD web application interface. At the top, there is a navigation bar with a menu icon, the text "DHD", and a "Logout" button. The main content area is divided into several sections:

- Left Sidebar:** Contains workflow management options: "SCORING CRITERIA", "SCORE", "SEND TO REVIEW", "APPROVE", and "COPY". Below these is a "No codes selected." message and a list of checkboxes for filtering: "Unscored", "In Production", "Discontinued", "In Review", "Has Attributes", "Needs Discussion", and "Changed By Update".
- Central Panel:** A dropdown menu is open, showing a list of code systems: "CPT-4", "HCPCS", "ICD-10-CM", "ICD-10-PCS", "ICD-9", "ICD-9-V3", "LOINC", "MediSpan", "NDC", "RxNorm", and "SNOMED".
- Right Panel:** Features a search bar labeled "Search a code or description" with a magnifying glass icon. Below it is a table with columns for "Description", "Score", and "Selected". The table is currently empty. At the bottom right of the table area, there is a pagination control showing "Rows per page: 25" and "0-0 of 0".

Two blue callout boxes provide additional context:

- A callout box pointing to the central dropdown menu contains the text: "Repeatable and automated process for code system updates".
- A callout box pointing to the "Has Attributes" checkbox in the left sidebar contains the text: "Workflow management".

# Relationships Between Code Sets

How does one code relate to another?

Clinical is not the same as underwriting

Crosswalks ADD NEW CROSSWALKS

Incoming Code System	Incoming Code	Linked To	Crosswalked Code System	Crosswalked Code	Crosswalked Score	
ICD-9	<a href="#">249.30</a>	→	ICD-10-CM	<a href="#">E08.01</a>	6	×
ICD-9	<a href="#">249.20</a>	→	ICD-10-CM	<a href="#">E08.01</a>	6	×
ICD-9	<a href="#">249.21</a>	→	ICD-10-CM	<a href="#">E08.01</a>	6	×

# Scoring

The screenshot shows the 'DHD' interface with a 'Logout' button in the top right. The main content area is titled 'ICD-10-CM' and includes a search bar. Below the search bar is a table with the following columns: Code, Description, Score, and Selected. The table lists various ICD-10-CM categories and codes, including E08.01, which is highlighted by a callout bubble.

Code	Description	Score	Selected
> 1	1. Certain infectious and parasitic diseases (A00-B99)		<input type="checkbox"/>
> 2	2. Neoplasms (C00-D49)		<input type="checkbox"/>
> 3	3. Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)		<input type="checkbox"/>
∨ 4	4. Endocrine, nutritional and metabolic diseases (E00-E89)		<input type="checkbox"/>
> E00-E07	E00-E07 Disorders of thyroid gland (E00-E07)		<input type="checkbox"/>
∨ E08-E13	E08-E13 Diabetes mellitus (E08-E13)		<input type="checkbox"/>
∨ E08	E08 Diabetes mellitus due to underlying condition	6	<input type="checkbox"/>
∨ E08.0	E08.0 Diabetes mellitus due to underlying condition with hyperosmolarity	6	<input type="checkbox"/>
E08.00	Diabetes mellitus due to underlying condition with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)	7	<input type="checkbox"/>
E08.01	Diabetes mellitus due to underlying condition with hyperosmolarity with coma	6	<input type="checkbox"/>

Utilizes global healthcare standards

# Scoring Attributes

**E08.00** ⓘ ICD-10-CM

**Short Description**  
Diab d/t undrl cond w hyprosm w/o nonket hyprgly-hypros coma

**Medium Description**  
Diab d/t undrl cond w hyprosm w/o nonket hyprgly-hypros coma

**Long Description**  
Diabetes mellitus due to underlying condition with hyperosmolarity without nonketotic hyperglycemic-hyperosmolar coma (NKHHC)

Base Score 7 ✎ Base Score (Production) 7

Score by Reference Date

age >= 41   age <= 60   **Score: 6**

age >= 31   age <= 40   **Score: 7**

age <= 30   **Score: 9**

age > 61   **Score: 5**

**Status** HISTORY

● Scored   ● Reviewing   ● In Production

Needs Discussion   **Last Modified By:** s0046367

Changed

CANCEL REVIEW APPROVE

**Notes** +

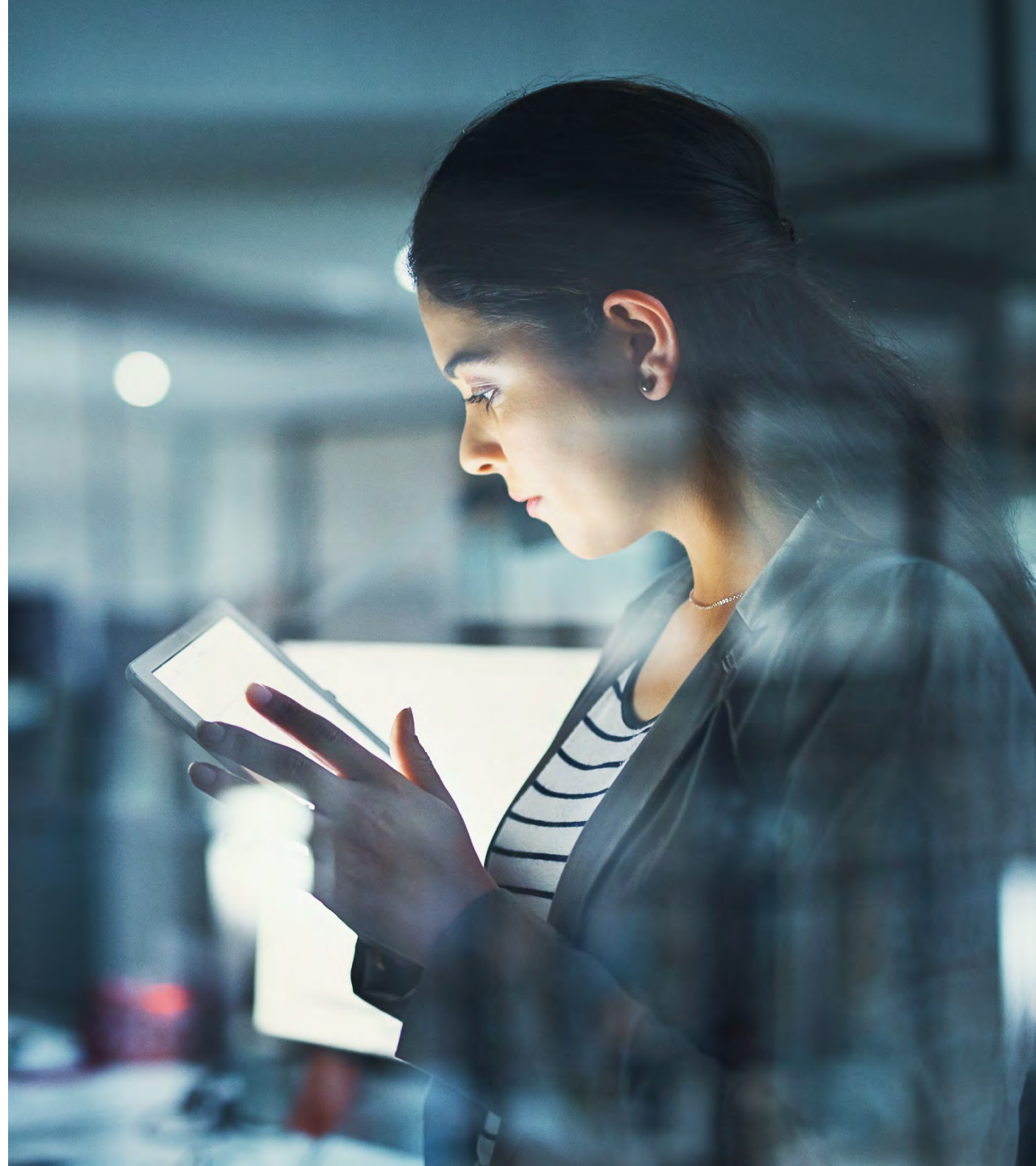
**system** (description) 03/19/2019

Diabetes with hyperosmolarity is a medical emergency that involves extremely high blood glucose levels, dehydration, and decreased consciousness that can lead to coma, without the presence of ketones or acidosis. Hyperosmolarity occurs when high blood concentrations of glucose, sodium, and other molecules become even higher because the kidneys are conserving water. The kidneys normally help balance high blood glucose and ion levels by excreting extra amounts in the urine, but when the kidneys begin conserving water, the concentrations climb higher and there is a greater need for water. Signs include

Advanced scoring attributes

# RGA

- 
- New Opportunity, New Challenge
  - Purpose-Built Industry Solution
  - **Practical Applications**



# Leveraging DHD Scoring



- Right size, right fit use case
  - Data source/aggregator pilot comparison
  - Additional source of data for triage
  - Preferred knock-out
  - Ensure that significant risk is not missed

- Benefits
  - Consistent underwriting assessment
  - Ability to effectively assess large amounts of coded data and begin automating



# Significant Risk Detection

Use case for life underwriting



## Applicant Demographics

- Male, Age 55; Married, NS
- Height 6'0", Weight 184
- Average BP 120/83

All  
Standard

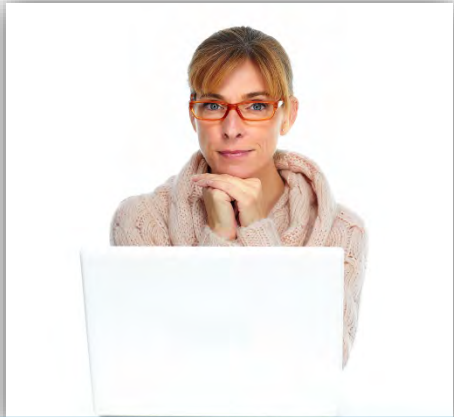
## Problem List

34713006	Vitamin D Deficiency	3	59282003	Pulmonary Embolism	5
272.4	Hyperlipidemia	3	193462001	Insomnia, Unspecified	2
I10	Essential (primary) hypertension	3	13397100	Chronic Pulmonary Embolism	9
K21.9	Gastro-esophageal reflux disease without esophagitis	2	48694002	Anxiety	4
E03.9	Hypothyroidism, unspecified	3			

**\*Decline!**

# Acceleration Eligibility

Use case for life underwriting



## Applicant Demographics\*

- Female, Age 50; Married, NS
- Height 5'4", Weight 126
- Average BP 133/82

All  
Standard

Accelerated

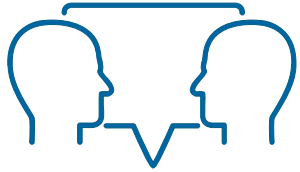
Problem List (10/17 – 05/19)			Procedures (10/17 – 05/19)		
E78.0	Pure Hypercholesterolemia	3	93784	Ambulatory blood pressure monitoring...	1
I10	Essential (primary) hypertension	3	3075F	Most recent systolic blood pressure 130-139 mm Hg	1
<b>Rx</b>					
	Diovan	4	3079F	Most recent diastolic blood pressure 80-89 mm Hg	1
	Pravachol	3	80061	Lipid panel...	1
			82465	Cholesterol, serum or whole blood, total	1
			83718	Lipoprotein, direct measurement, high density cholesterol (HDL cholesterol)	1
			84478	Triglycerides	1

# RGA DHD Scoring Foundation



## Longstanding DHD expertise

A decade of DHD expertise



## RGA underwriting expertise

RGA has underwritten more than three million cases



## Long-term perspective as a risk-sharing partner

Vested stake in accuracy and long-term results



## Industry solution

Agnostic to data source



Thank you

