



## Incorporate Third Party Scoring in Accelerated Underwriting

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# Accelerated Underwriting (AU)

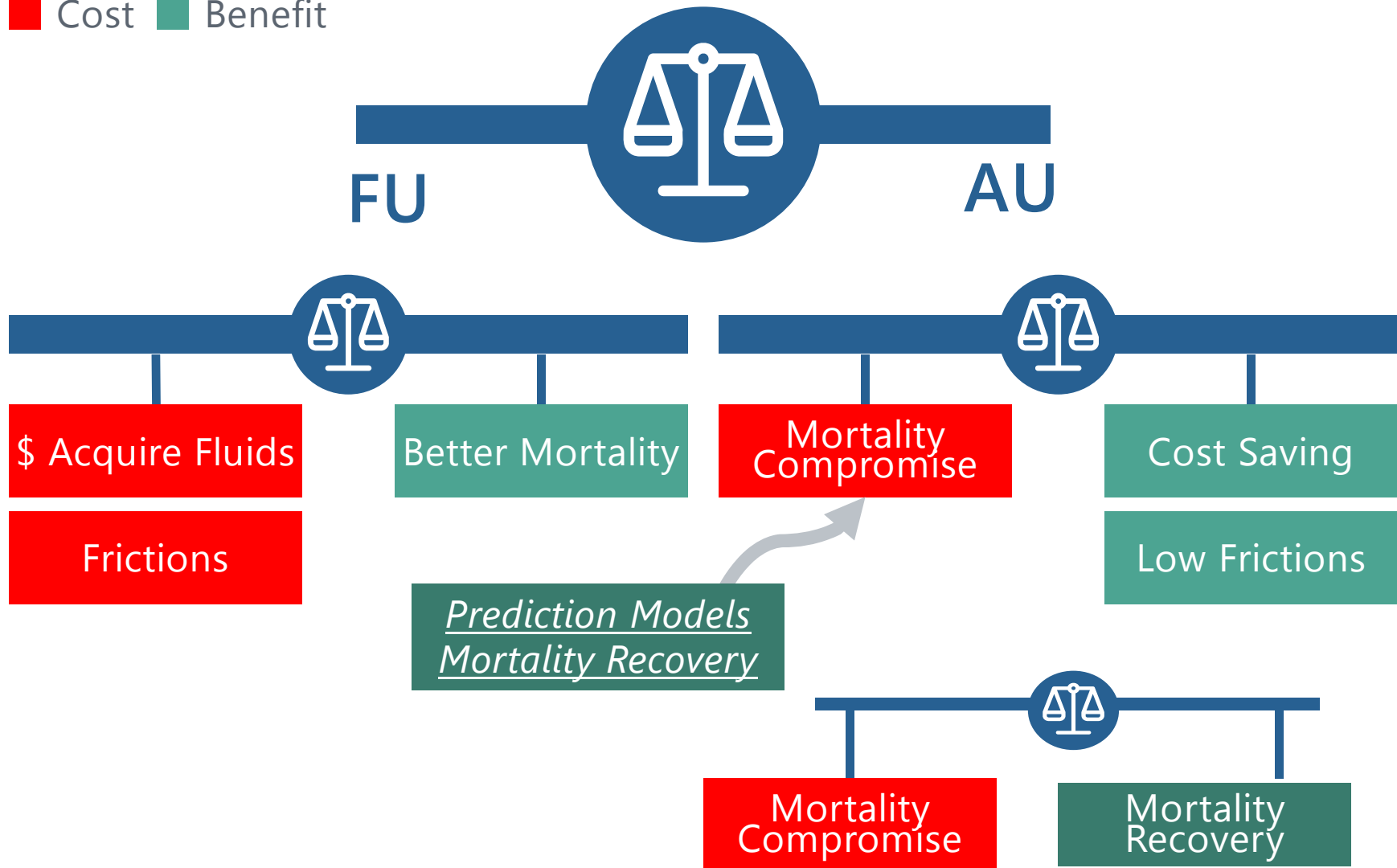


Remove paramedical exams and laboratory fluid requirements from Full Underwriting (FU) yet preserve FU pricing

# Cost vs. Benefit



■ Cost ■ Benefit



# Three Key Questions



1. What is the **mortality compromise/slippage** of not having fluids and paramedical exam?
2. How much of **mortality recovery/compensated** by AU models?

Three mortality recovery mechanisms by AU models:

1. Identify features where the protective values of fluids and paramedical exam are lower.
  2. Strengthens/tightens other underwriting requirements.
  3. Use additional requirements (credit, Rx score) to differentiate mortality.
3. How much does AU impact applicants' **movement/disclosure** between FU and AU products?

It is all about by how much.

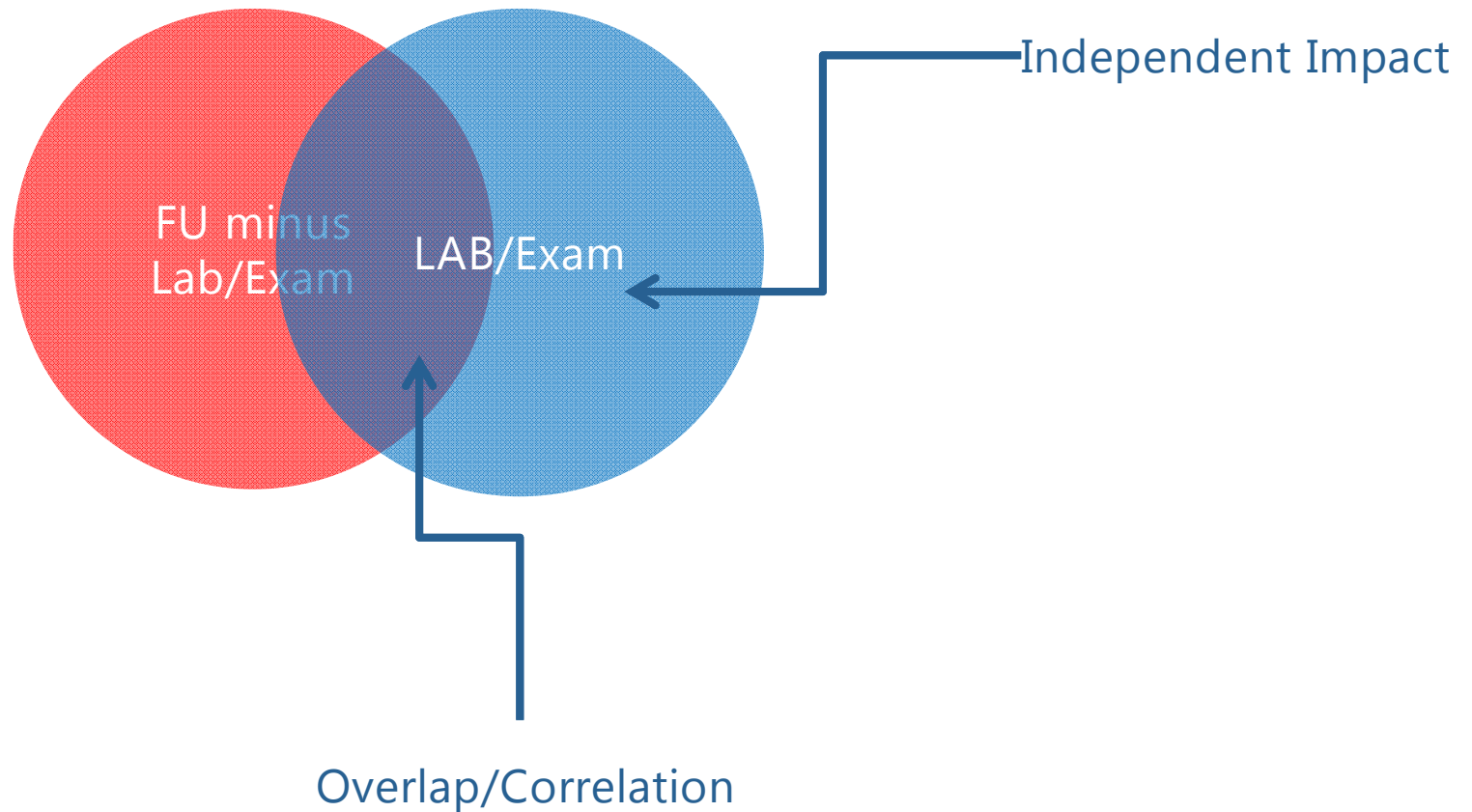
# 1. Mortality Compromise/Slippage



- Mortality Compromise=Protective Values of Fluids/Exam
  - Prevalence/likelihood of “positive” finding (hyperlipidemia, HBP, impaired kidney/liver function, undiagnosed diabetes, smoking)
  - Impact of UW decision
  - Exclusivity
  - Sentinel effects
- How to Study This?
  - Retrospective company-specific study of FU business — *Simulate* AU results by ignoring the values of fluids and paramedical exam

		AU						
FU	S Preferred	Preferred	STD	Rated	Decline	Sub Total	Mortality	
S Preferred	40					40	60%	
Preferred	3	29				32	80%	
STD	1	2	11			14	100%	
Rated	0	1	1	5		7	200%	
Decline	0	1	0	0	6	7	500%	
<b>Sub Total</b>	<b>44</b>	<b>33</b>	<b>12</b>	<b>5</b>	<b>6</b>	<b>100</b>		
<b>Mortality</b>	<b>62%</b>	<b>98%</b>	<b>108%</b>	<b>200%</b>	<b>500%</b>			
<b>Aggregate mortality excluding decline</b>								
	Mortality	Expected	Ratio					
AU	88%	80%	110%					
FU	83%	83%	100%					

# Exclusivity: Overlap vs. Independent Impact



## 2. Mortality Recovery by AU Models



### Three Mechanisms

1

Identify features where the protective values of fluids and paramedical exam are lower.

2

Strengthens/Tightens other underwriting criteria.

3

Use additional requirements (credit, Rx score) to differentiate morality.



# Mortality Recovery



Tighten up other underwriting criteria to shift class distributions to higher risk class

## Before

AU							
FU	S Preferred	Preferred	STD	Rated	Decline	Sub Total	Mortality
S Preferred	40					40	60%
Preferred	3	29				32	80%
STD	1	2	11			14	100%
Rated	0	1	1	5		7	200%
Decline	0	1	0	0	6	7	500%
<b>Sub Total</b>	<b>44</b>	<b>33</b>	<b>12</b>	<b>5</b>	<b>6</b>	<b>100</b>	
<b>Mortality</b>	<b>62%</b>	<b>98%</b>	<b>108%</b>	<b>200%</b>	<b>500%</b>		

Aggregate mortality excluding decline			
	Mortality	Expected	Ratio
AU	88%	80%	110%
FU	83%	83%	100%

## After

AU							
FU	S Preferred	Preferred	STD	Rated	Decline	Sub Total	Mortality
S Preferred	30	5	5			40	60%
Preferred	1	22	6	3		32	80%
STD	1	2	11			14	100%
Rated	0	1	1	5		7	200%
Decline	0	1	0	0	6	7	500%
<b>Sub Total</b>	<b>32</b>	<b>31</b>	<b>23</b>	<b>8</b>	<b>6</b>	<b>100</b>	
<b>Mortality</b>	<b>62%</b>	<b>95%</b>	<b>90%</b>	<b>155%</b>	<b>500%</b>		

Aggregate mortality excluding decline			
	Mortality	Expected	Ratio
AU	88%	88%	100%
FU	83%	83%	100%

How does it impact taken-up rate?

# Mortality Recovery



Use *additional* requirements such as...

## LexisNexis Risk Classifier (LN\_RC) and Milliman Rx Risk Score

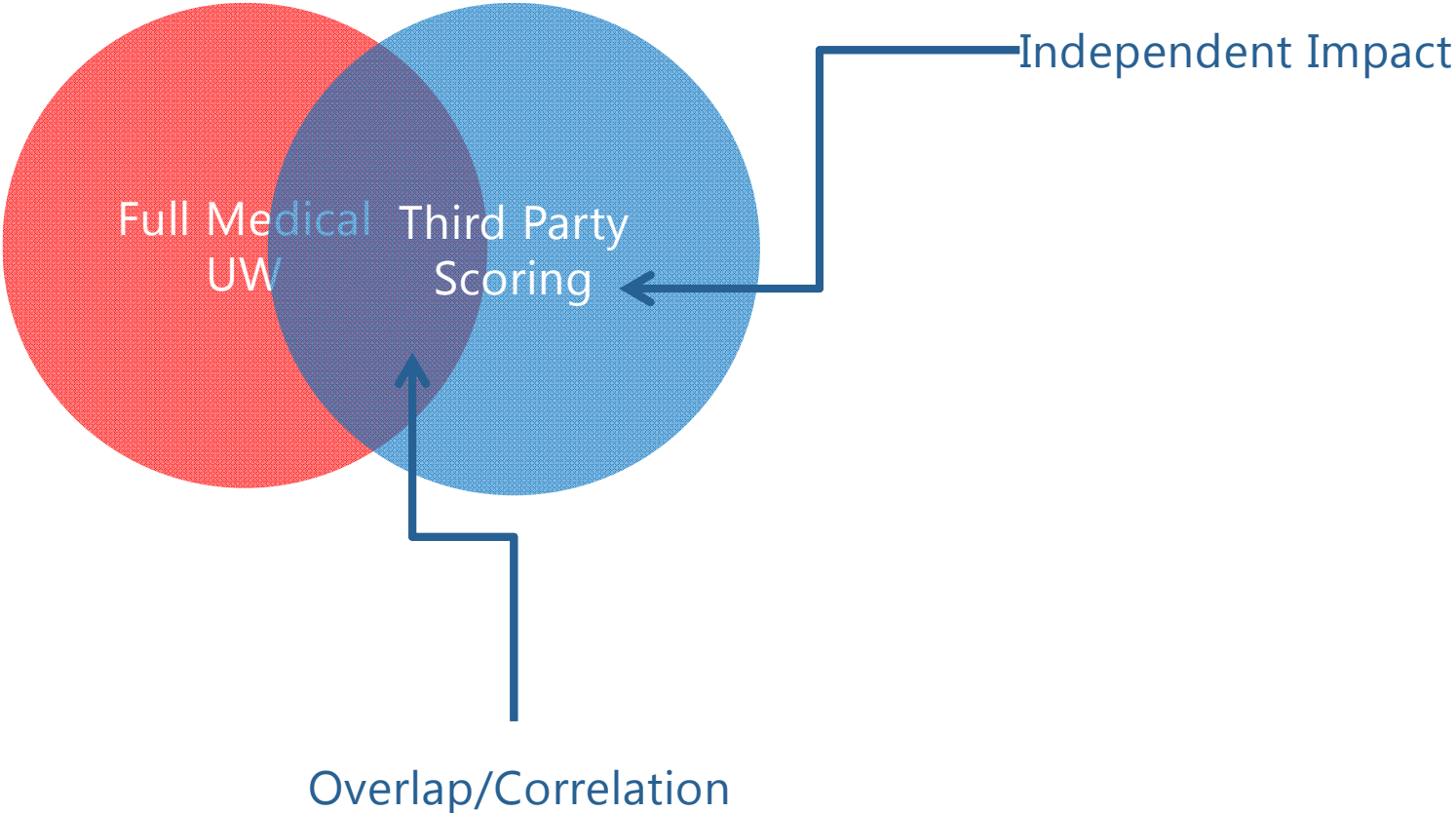
Mortality differentiation that goes *beyond* conventional medical FU (*independent* impact from FU)

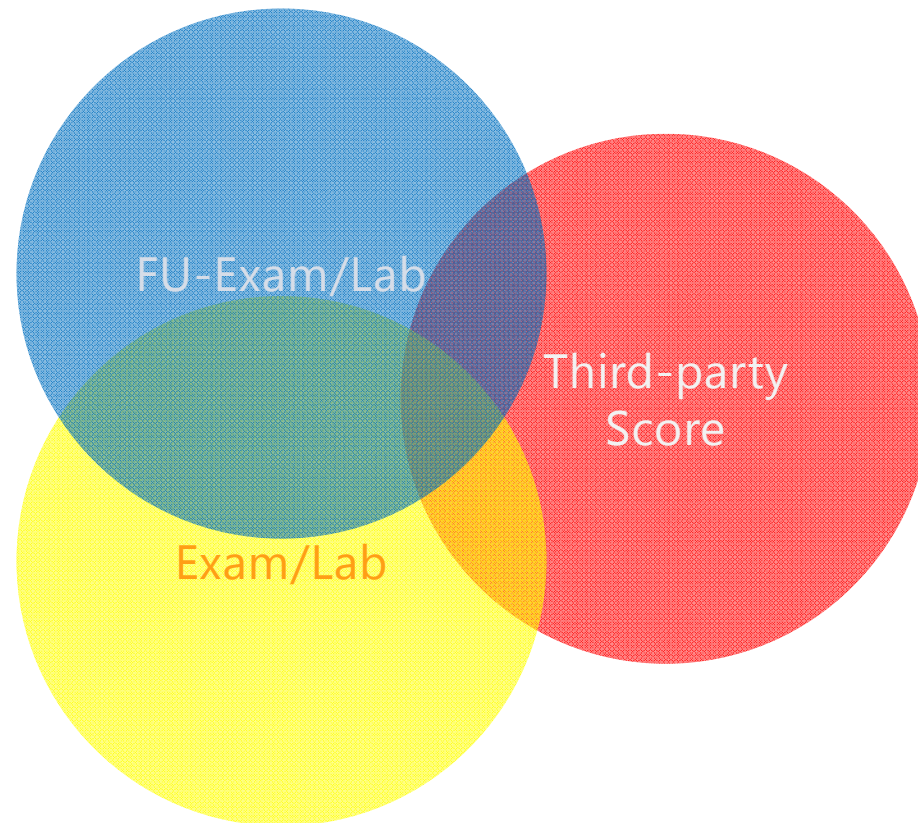
Mortality differentiation that *overlaps* with conventional medical FU (*Correlation* with FU)

# Third Party Scoring and FU



## Overlap vs. Independent Impact







# Milliman Rx Score LexisNexis Risk Classifier

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# The Milliman Rx Risk Score



Source: Milliman, 2017

# LexisNexis Risk Classifier<sup>®</sup> – Data Source



Source: LexisNexis 2017

# Gen Re Evaluation of Both Scores



## Analysis in Research Population

	Milliman Study	LN Study
Population	13M	7M
Deaths	231K	126K

## Review Studies in Target Population

- Differ from research population?
- Independent of FU?
- Overlap/Correlation with FU?

## Compare two scores:

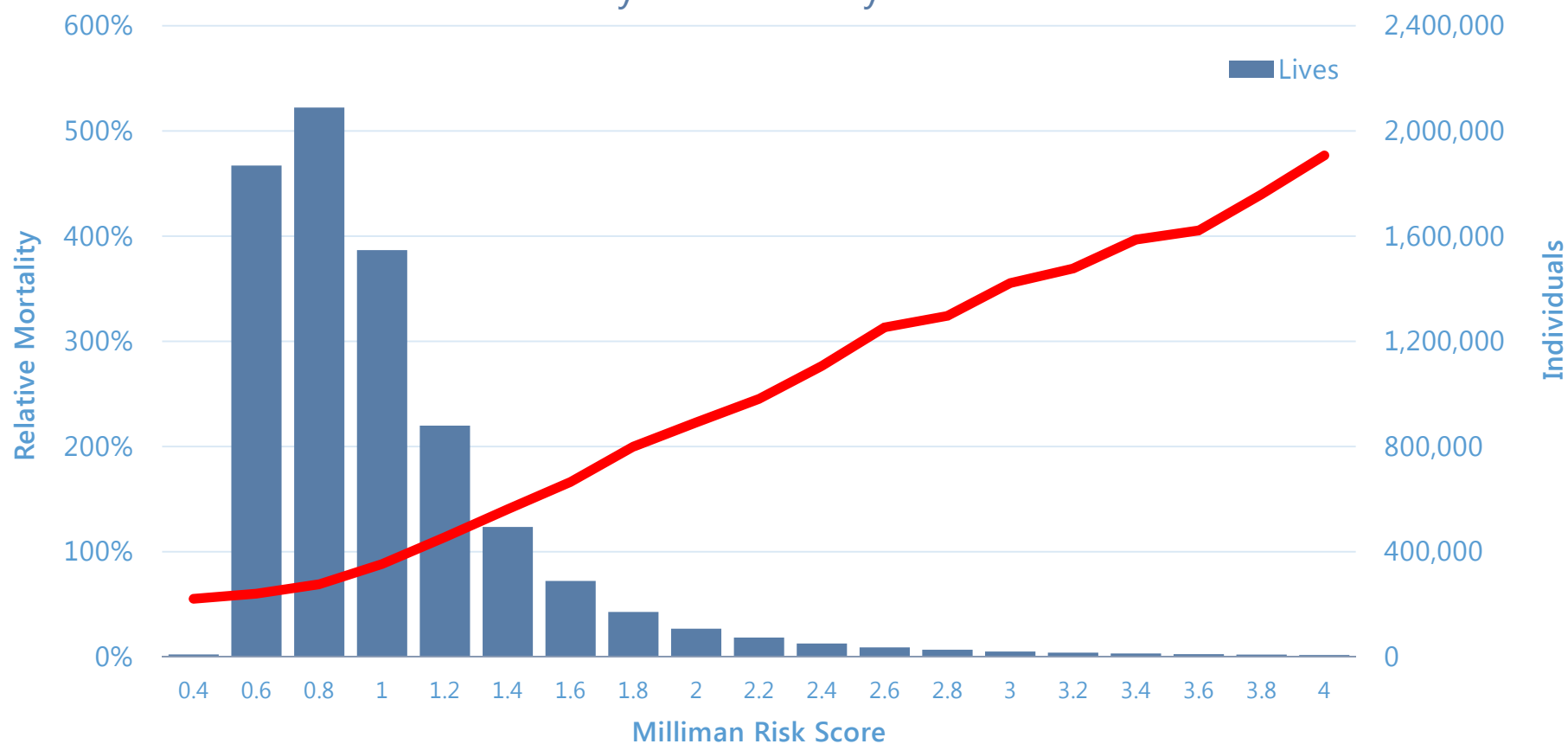
- Complement each other?



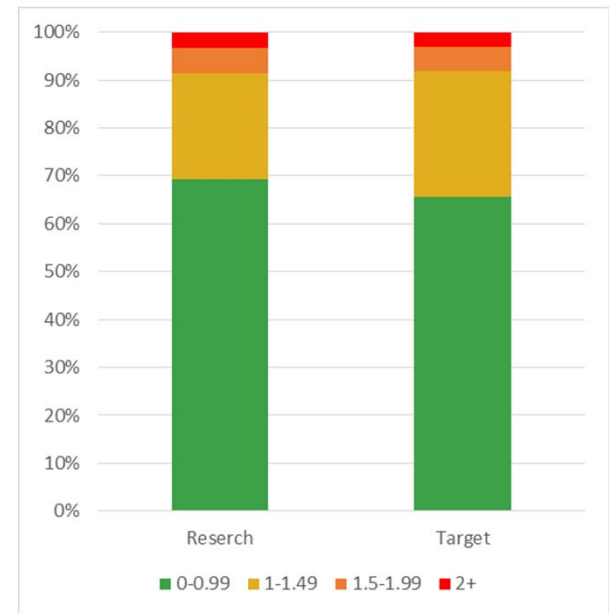
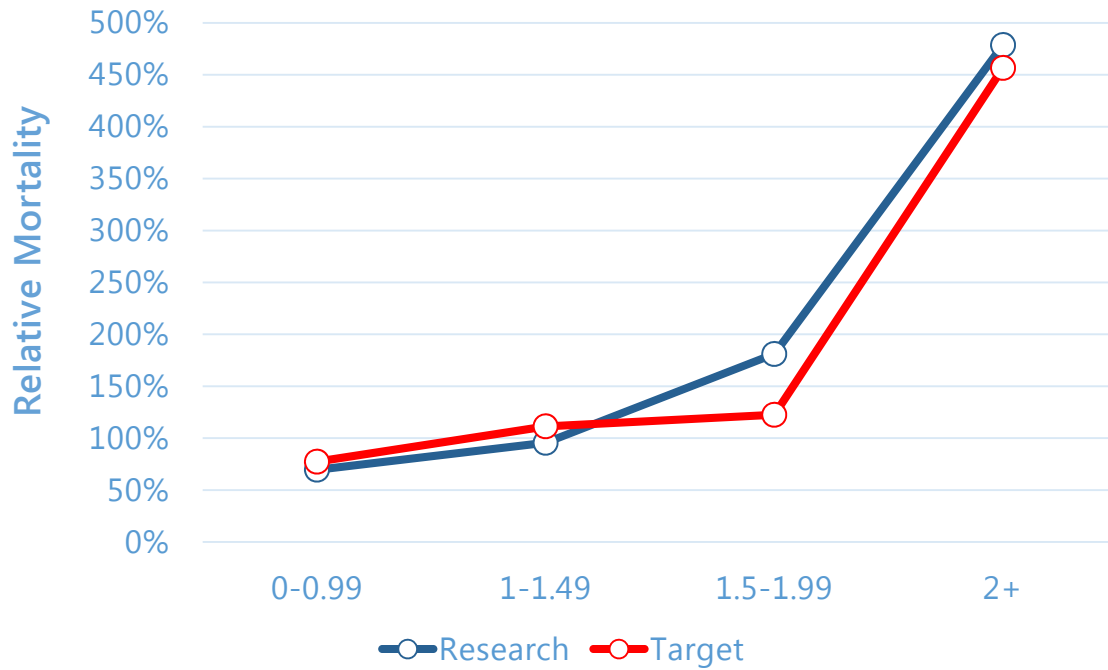
# Milliman's Risk Score in Research Population



## Relative Mortality and Lives by Milliman Risk Score



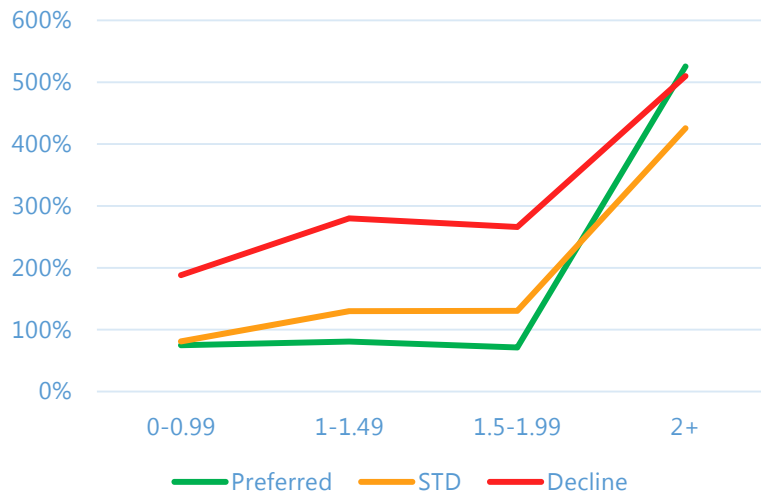
# Milliman Risk Score and Mortality: Research vs. Target Population



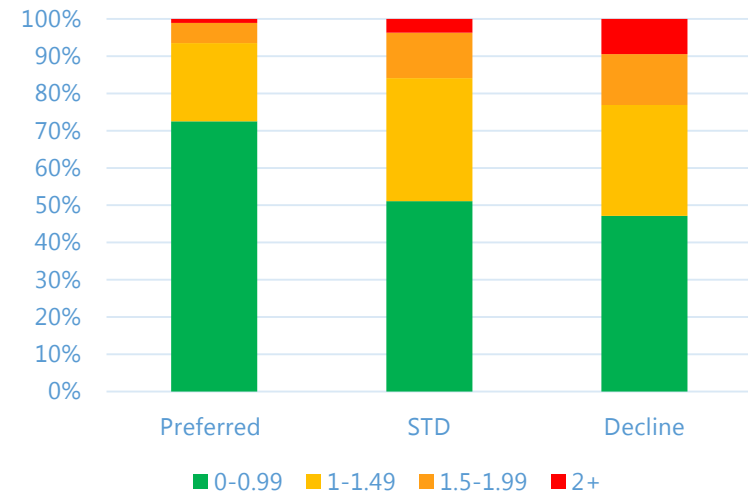
# Milliman Score's Association with Full Underwriting



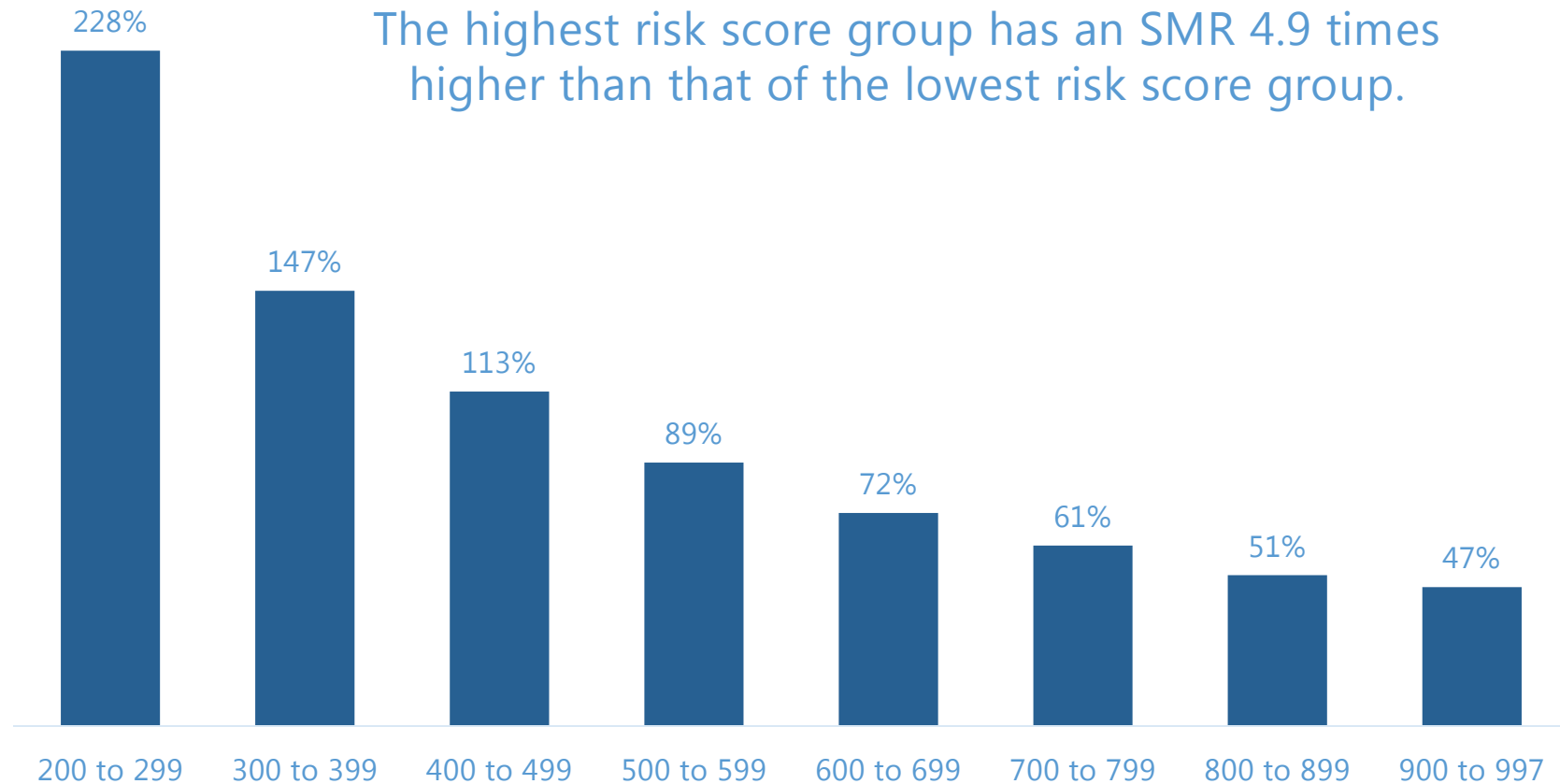
## Independence of FU



## Correlation with FU



# Risk Classifier<sup>®</sup> Score Predicts Mortality in Research Population

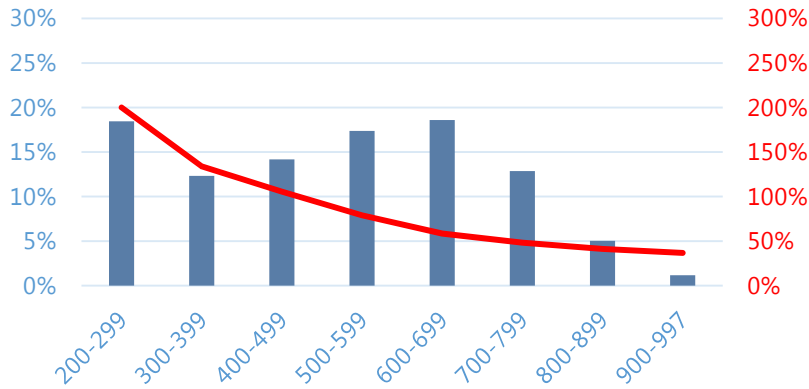


Age 18-89  
Expected deaths from the 2008 Primary VBT. SMR calculated as A/E divided by overall population A/E.

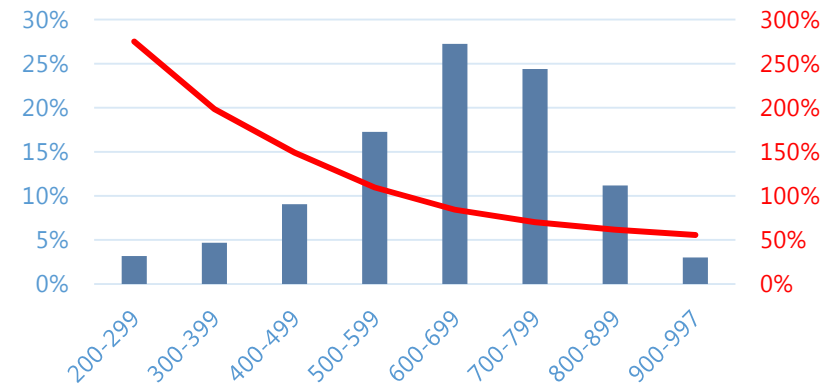
# Risk Classifier Predicts Mortality in Research/Target Population



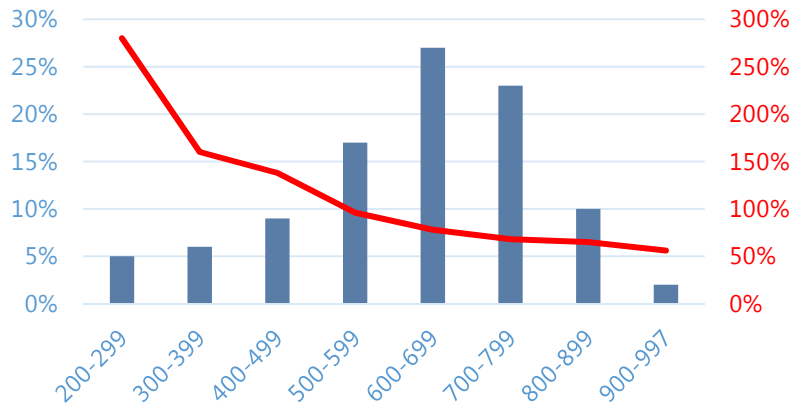
Research Population  
(N=6.5M, age 20-59)



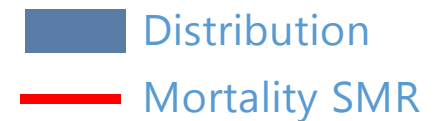
Subset of Research Population  
(SES=high, N=2M, age 20-59)



Target Population\*



SES is defined by income, education, mortgage payment etc.

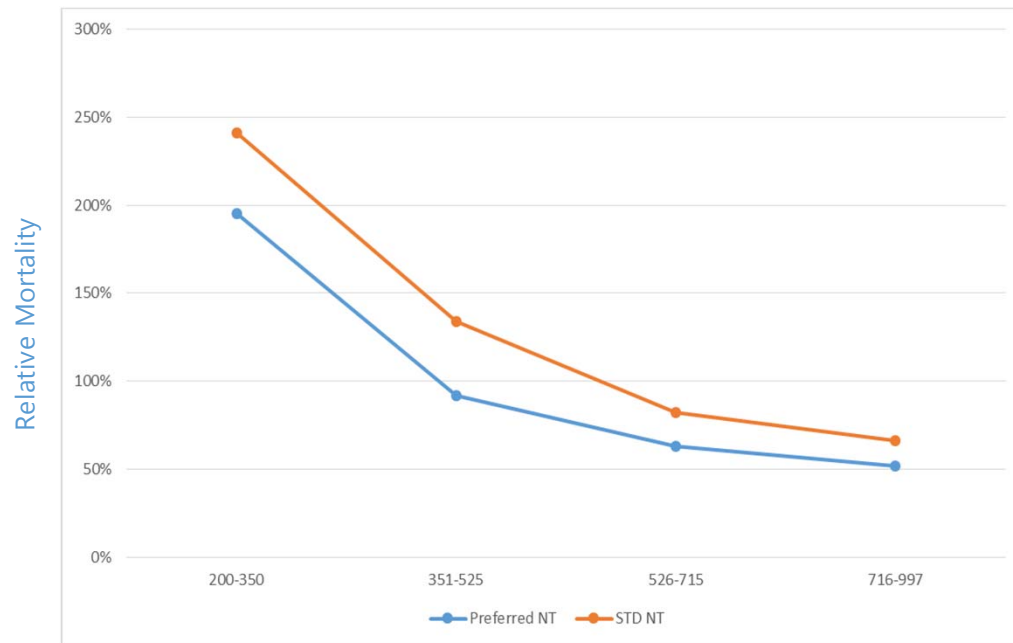


\* Source: LexisNexis study, 2016.

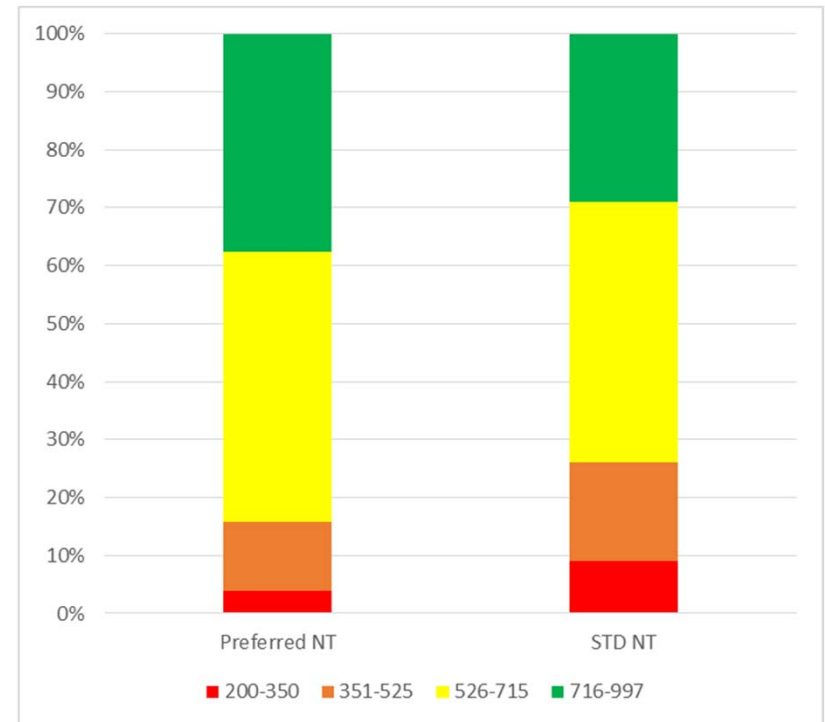
# Risk Classifier Score's Association with Full Underwriting

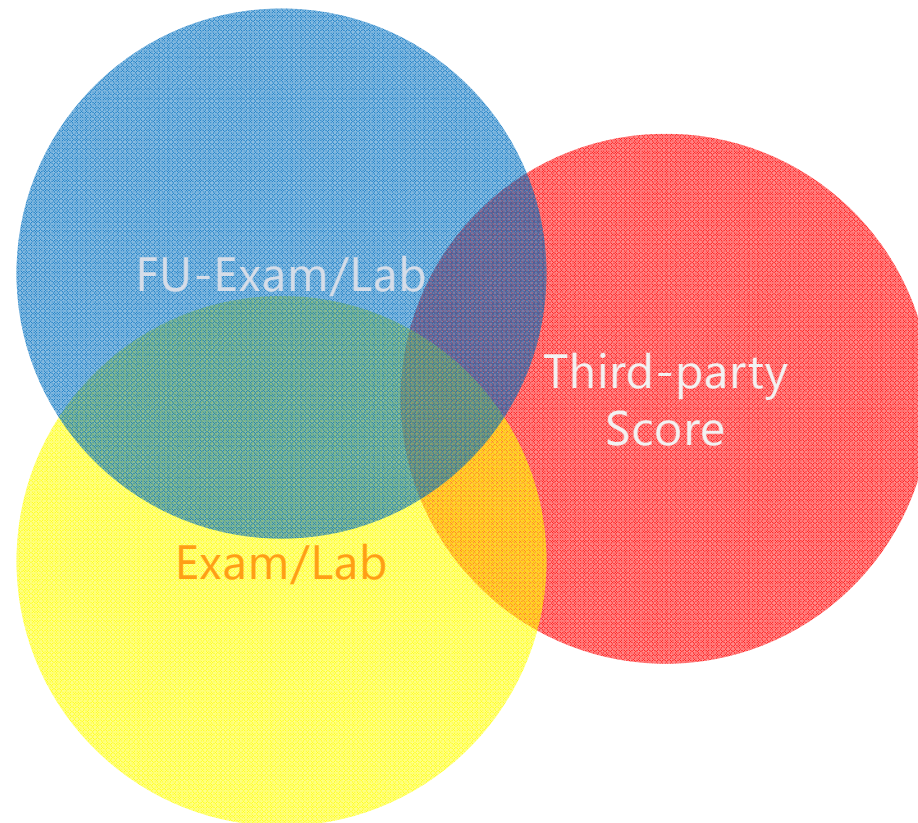


## Independence of FU



## Correlation with FU

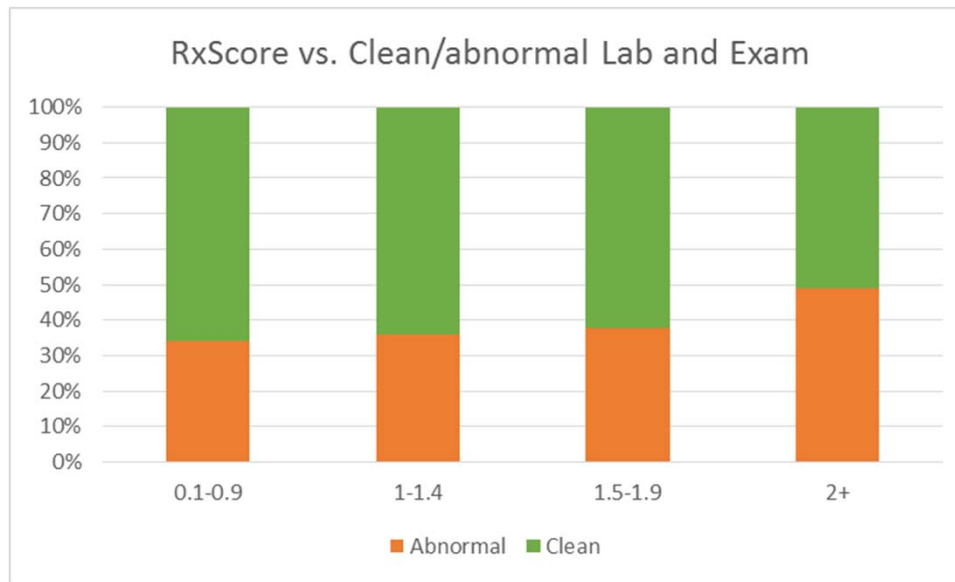




# Correlating between RxScore and Abnormal Lab/BP



Abnormal is defined as values that adverse underwriting action is warranted (not including urine nicotine)

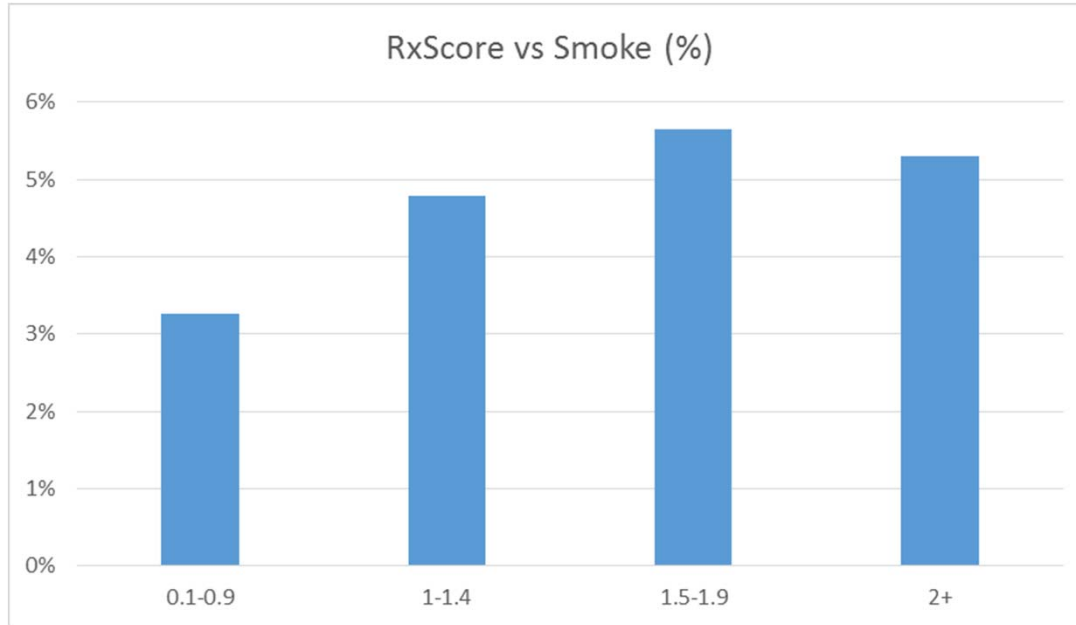


Lab/exam	Average Rx Score
Clean	0.897
Abnormal	0.939

Among cases with RxScore



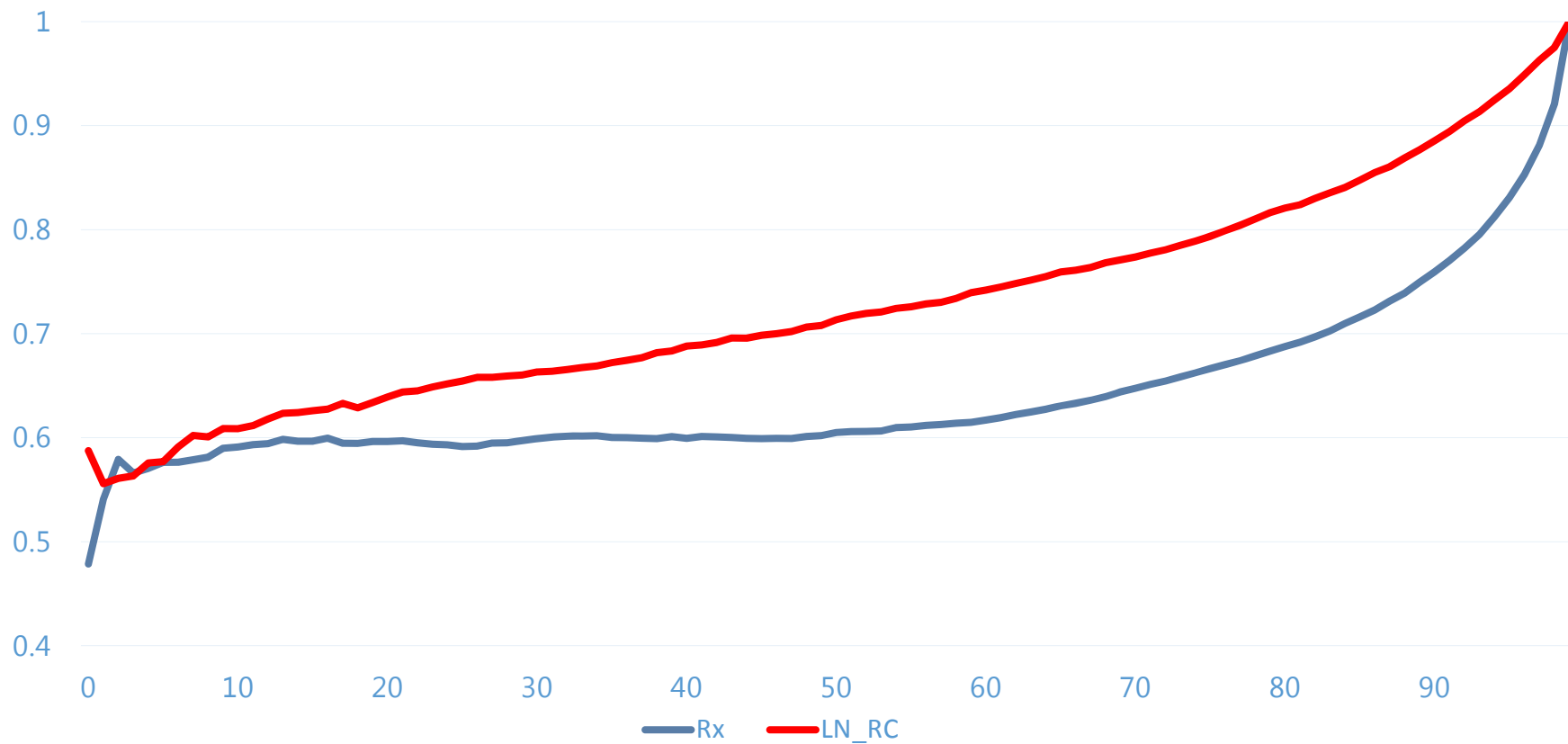
# Smoking vs. RxScore



## Average Rx Score

Smoker	1.00
No-smoker	0.91

# Performance Variations Makes The Two Scores Complement Each Other



Scores percentile in risk ascending order vs. cumulative mortality



## Thank you

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