

# Pharmacy and Actuarial Perspectives On Underwriting with Rx Histories

American Academy of Insurance Medicine

Loews New Orleans Hotel  
Tuesday, Sept. 24<sup>th</sup>  
10:20 am to 11:20 am

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# Agenda

- Rx data sources
- Value of Rx histories
- Limitations and challenges
- Rule engines

# Prescription drug use in the U.S. continues to increase.

- Spending

- In 2008, consumers spent \$234 billion on prescription drugs
- Doubled from 1999

- Utilization

- 48% of U.S. citizens used at least one prescription drug in the past month (2005-2008) up from 44% from 10 years prior
- Cholesterol lowering drugs remain by far the most commonly used prescription drug (2007-2008)

Center for Disease Control and Prevention. Health, United States, 2010; Table 94

# Rx history usage is increasing.

## Life insurer survey results . . .

- 77% reported using Rx in 2012 . . . 41% in 2007
- 13% reported considering using Rx
- 71% increased use of Rx
- 40% said Rx significantly contributed to the underwriting decision on more than 15% of cases



Hank George Survey, 2012 Simplified Issue Survey (96 companies reporting)  
Hank George Survey, November 2010 (99 companies reporting)

## Rx histories have become a standard screening tool.

*“At present nearly 80 percent of life carriers deploy pharmacy records in life underwriting....Virtually all others are at some stage of vetting this asset”.*

*Making Progress in Life Underwriting. Resource. Feb 2012 ;12*

# Top Reasons Reported for Using Rx Histories

- Reduce anti-selection
- Improve mortality results
- Increase APS value by more selective ordering
- Reduce turnaround time
- Reduce APS use
- Reduce underwriting costs
- Facilitate automated underwriting
- Increasing use of Rx histories by competitors

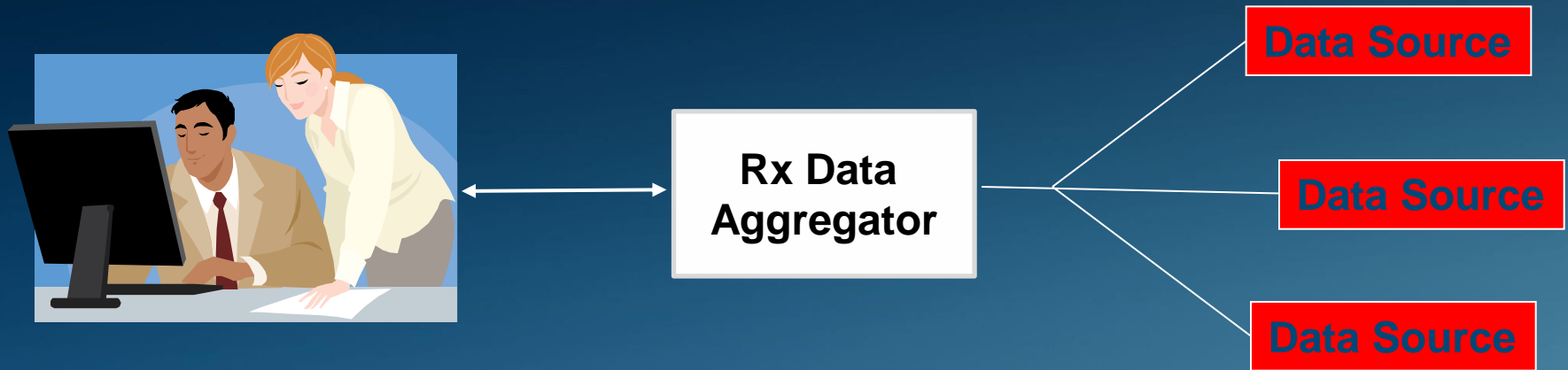
Hank George Survey, November 2010



**“I’m prescribing a squiggly line, two slanted loops,  
and something that looks like a P or J.”**

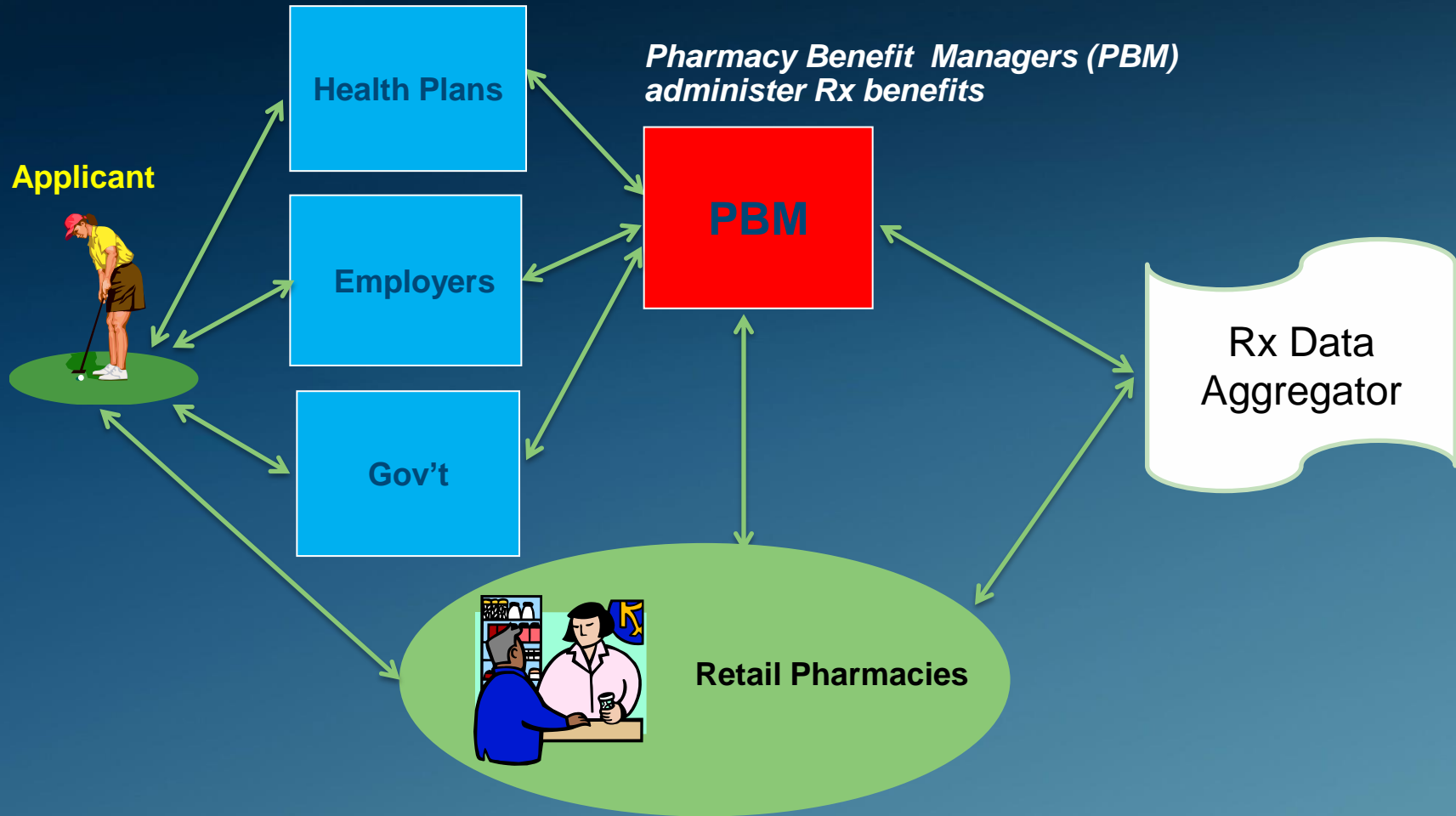


# How does it work?



1. Obtain the authorization
2. Submit the query
3. Review the results

# Rx data come from multiple sources.



## Rx history metrics . . .

- Results usually returned in 3 - 5 seconds
- Hit rate varies by line of business / insurer
  - Average Hit rate: 75%
  - Key driver: Socioeconomic status of applicant pool

# Sample Prescription History

<span>[-]</span> Type1 Diabetic <a href="#">52 Fills</a> <a href="#">Doctors</a> <a href="#">Pharmacies</a> <a href="#">Hank's RxGuide</a> <span style="float: right;">Show Rx Details</span> SSN 990-09-0150 DOB 5/12/1963 Age 48 Female Zip Code 30117																				
<span>+</span> <span>!</span> Rule Results <span style="float: right;">Clear Highlights</span>																				
Prior	2009			2010			2011			2012										
							4	5	6	4	4	9	5	2	7	4	1			
<span>+</span>	FLUCONAZOLE (Fluconazole)		<a href="#">RxGuide</a>	HIGH																<a href="#">1 Fill</a>
<span>+</span>	FUROSEMIDE (Furosemide)		<a href="#">RxGuide</a>	HIGH																<a href="#">3 Fills</a>
<span>+</span>	LANTUS (Insulin Glargine)		<a href="#">RxGuide</a>	HIGH																<a href="#">4 Fills</a>
<span>+</span>	BENZAEPRI HCL/HYDROCHLOROTHIAZIDE (Benazepril & Hydrochlorothiazide)		<a href="#">RxGuide</a>	MEDIUM																<a href="#">9 Fills</a>
<span>+</span>	CYCLOBENZAPRINE HCL (Cyclobenzaprine HCl)		<a href="#">RxGuide</a>	MEDIUM																<a href="#">1 Fill</a>
<span>+</span>	GLIPIZIDE (Glipizide)		<a href="#">RxGuide</a>	MEDIUM																<a href="#">1 Fill</a>
<span>+</span>	GLIPIZIDE ER (Glipizide)		<a href="#">RxGuide</a>	MEDIUM																<a href="#">8 Fills</a>
<span>+</span>	HYDROCODONE/ACETAMINOPHEN (Hydrocodone-Acetaminophen)			MEDIUM																<a href="#">1 Fill</a>
<span>+</span>	METFORMIN HCL (Metformin HCl)		<a href="#">RxGuide</a>	MEDIUM																<a href="#">9 Fills</a>
<span>+</span>	METHOCARBAMOL (Methocarbamol)			MEDIUM																<a href="#">1 Fill</a>
<span>+</span>	PHENDIMETRAZINE TARTRATEER (Phendimetrazine Tartrate)			MEDIUM																<a href="#">1 Fill</a>

# Rx histories bring extensive information . . .

- Prescriber contact information
- Indication
- Inherent risk (i.e. Red, Yellow Green)
- Condition severity
- Medication adherence
- Prescriber type
- Number / list of pharmacies



# What's the value of an Rx rules engine?

- Efficient / Consistent interpretation
- Route important cases to underwriters
- More selective APS ordering
- Improved mortality

# Raw Fill History

SEROQUEL	Quetiapine Fumarate Tab 50 MG	HIGH	10/10/2010	NABORS, DEANNA R MD	WAL-MART PHA
SEROQUEL	Quetiapine Fumarate Tab 50 MG	HIGH	12/23/2010	NABORS, DEANNA R MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 50 MG	MEDIUM	5/19/2010	SCHAEFER, TIMOTHY FRANCIS MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 100 MG	MEDIUM	5/19/2010	SCHAEFER, TIMOTHY FRANCIS MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 50 MG	MEDIUM	6/26/2010	SCHAEFER, TIMOTHY FRANCIS MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 100 MG	MEDIUM	6/26/2010	SCHAEFER, TIMOTHY FRANCIS MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 100 MG	MEDIUM	7/25/2010	SCHAEFER, TIMOTHY FRANCIS MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 50 MG	MEDIUM	7/25/2010	SCHAEFER, TIMOTHY FRANCIS MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 100 MG	MEDIUM	8/27/2010	SCHAEFER, TIMOTHY FRANCIS MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 50 MG	MEDIUM	8/27/2010	NABORS, DEANNA R MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 100 MG	MEDIUM	10/3/2010	SCHAEFER, TIMOTHY FRANCIS MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 50 MG	MEDIUM	11/19/2010	NABORS, DEANNA R MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 50 MG	MEDIUM	12/23/2010	NABORS, DEANNA R MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 50 MG	MEDIUM	2/4/2011	NABORS, DEANNA R MD	WAL-MART PHA
SERTRALINE HCL	Sertraline HCl Tab 50 MG	MEDIUM	3/13/2011	Nabors , Deanna MD	
SERTRALINE HCL	Sertraline HCl Tab 100 MG	MEDIUM	4/14/2011	Nabors , Deanna MD	CAREMARK PRE
SERTRALINE HCL	Sertraline HCl Tab 100 MG	MEDIUM	9/12/2011	Nabors , Deanna MD	
SERTRALINE HCL	Sertraline HCl Tab 100 MG	MEDIUM	1/14/2012	Nabors , Deanna MD	
SERTRALINE HCL	Sertraline HCl Tab 100 MG	MEDIUM	4/24/2012	Nabors , Deanna MD	
SIMVASTATIN	Simvastatin Tab 40 MG	MEDIUM	5/18/2011	Nabors , Deanna MD	CAREMARK PRE
SIMVASTATIN	Simvastatin Tab 40 MG	MEDIUM	10/29/2011	Nabors , Deanna MD	
SIMVASTATIN	Simvastatin Tab 40 MG	MEDIUM	11/19/2011	Nabors , Deanna MD	
SIMVASTATIN	Simvastatin Tab 40 MG	MEDIUM	4/24/2012	Nabors , Deanna MD	
SYNTHROID	Levothyroxine Sodium Tab 150 MCG	MEDIUM	7/29/2010	NABORS, DEANNA R MD	WAL-MART PHA

# RxRules interprets prescription history data.



## Rule variables:

- Indication / Therapeutic class
- Drug combinations
- Red / Yellow / Green
- Fill timing
- Fill counts
- Dosage
- Physician specialty
- Gender / Age
- Other rules



# Case Studies



**This is Frank, he's our LEAN champion  
streamlining paperless information flow**

# Mortality Study Agenda

- Mortality study background and metrics
- Mortality study results
- Drug results review
- Evidence based Rx rules engine

# Mortality study

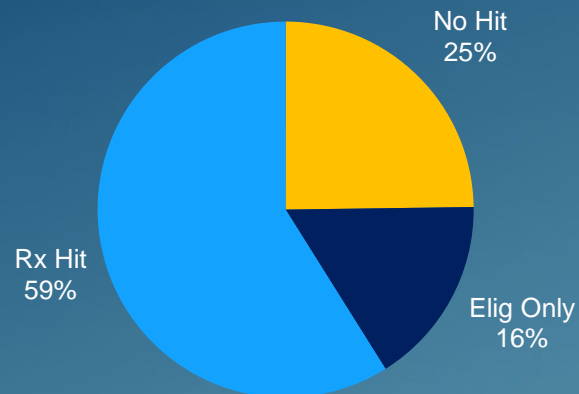
- Application Years 2005-2011 – all business lines
- Matched deaths using Social Security Master Death File based on SSN and DOB
- Only applicants that had valid SSN
- No claim data used

# Metrics

- 10.4M Applicants
- 45K Deaths
- Average Age = 46



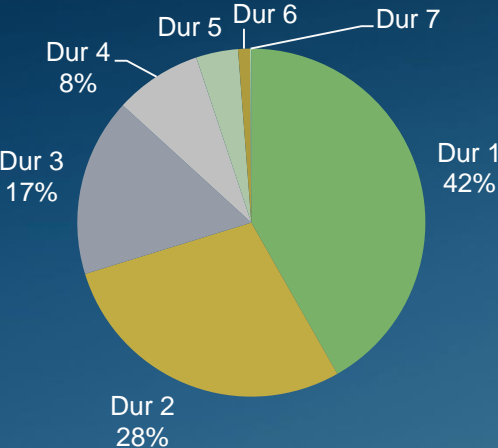
## Distribution of Applicants



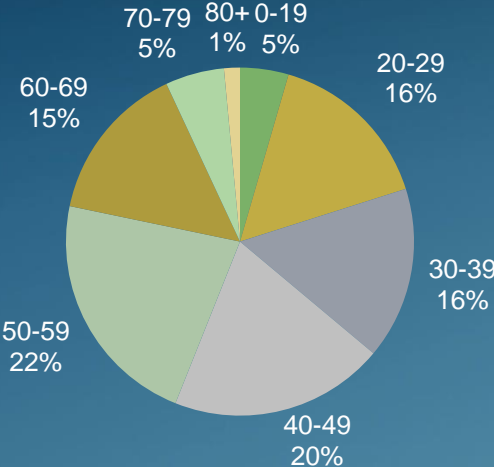
# Metrics

- 21.2M Exposure Years

### Exposure by Duration

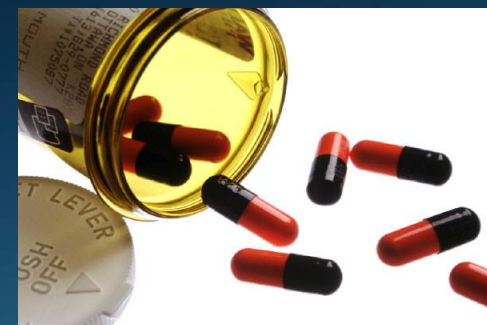


### Exposure by Age

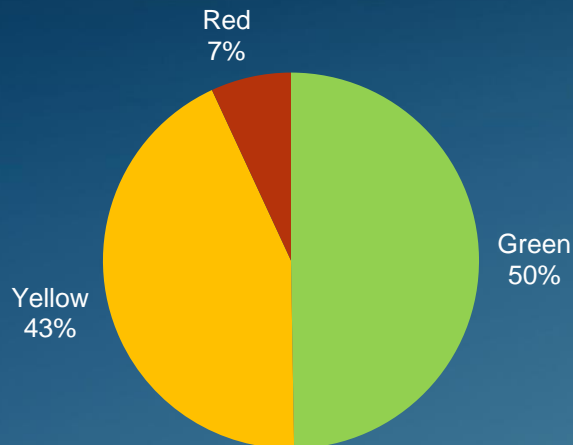


# Metrics – highest drug level

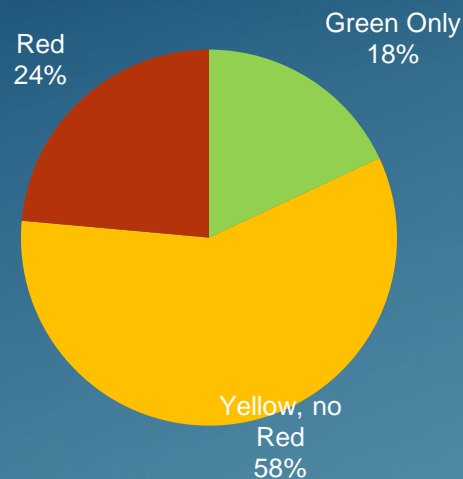
- 6.1M Applicants with at least one fill
- 275M Total fills



### Distribution of Fills



### Applicants with at least one fill



# Relative mortality

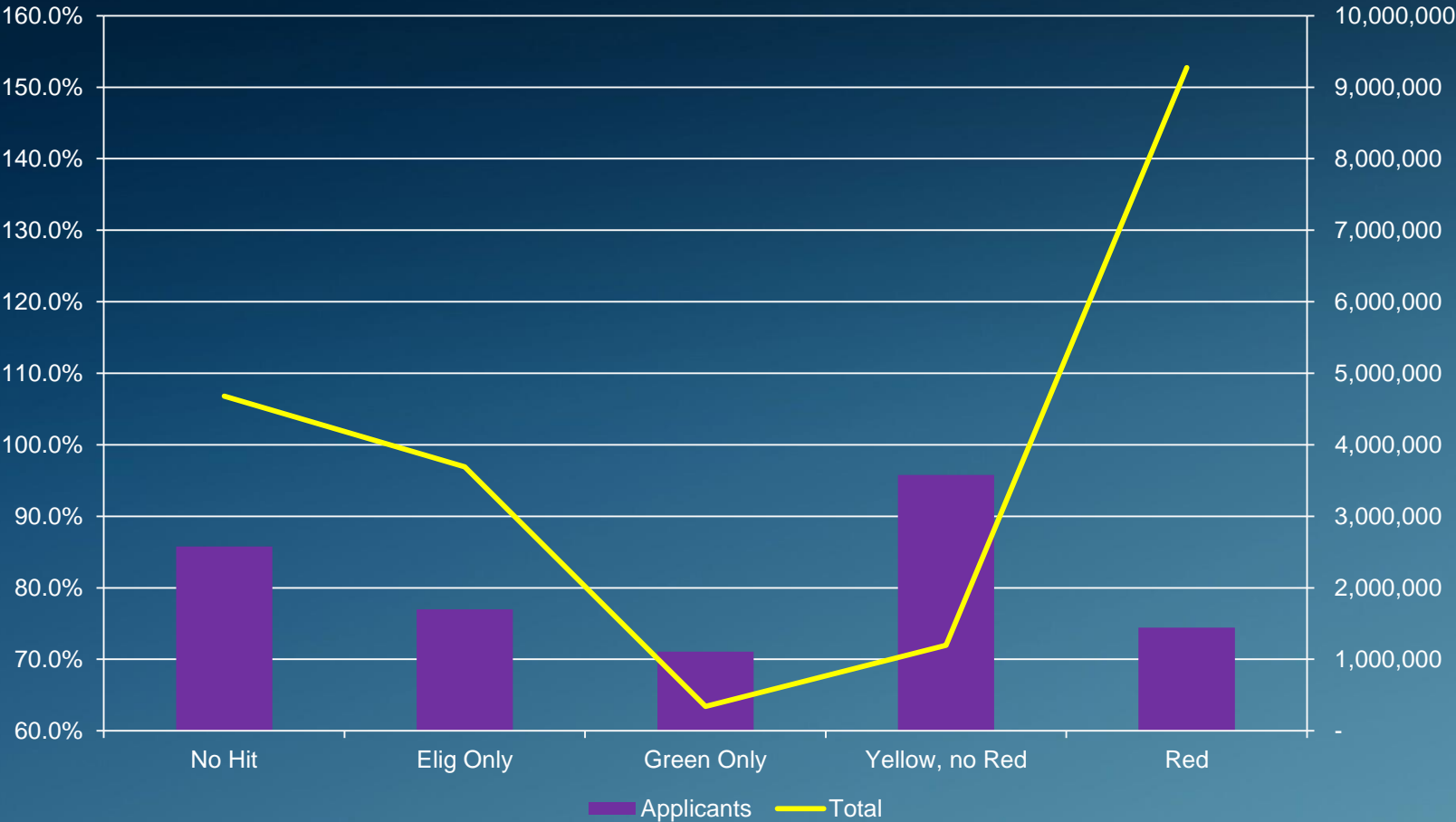
- Does not refer to a deceased mother-in-law
- Compares the mortality rate of a sub group vs. the overall group of 10.4M applicants



# Relative mortality example

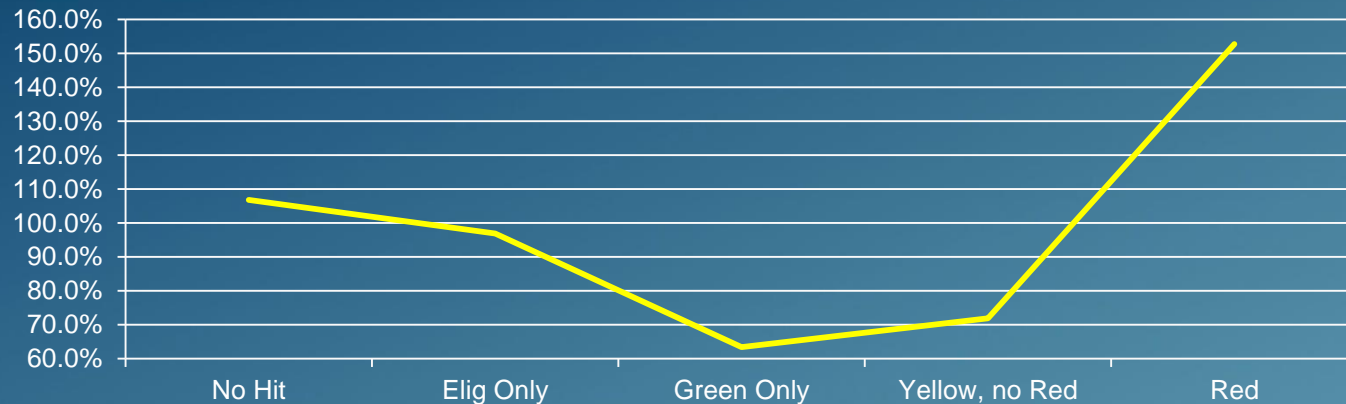
- Applicants who took the drug warfarin sodium died at a rate of 176% of the overall population of applicants
- Calculated as  $A/E$  for sub group divided by  $A/E$  for entire population of 10.4m applicants

# Relative mortality by status

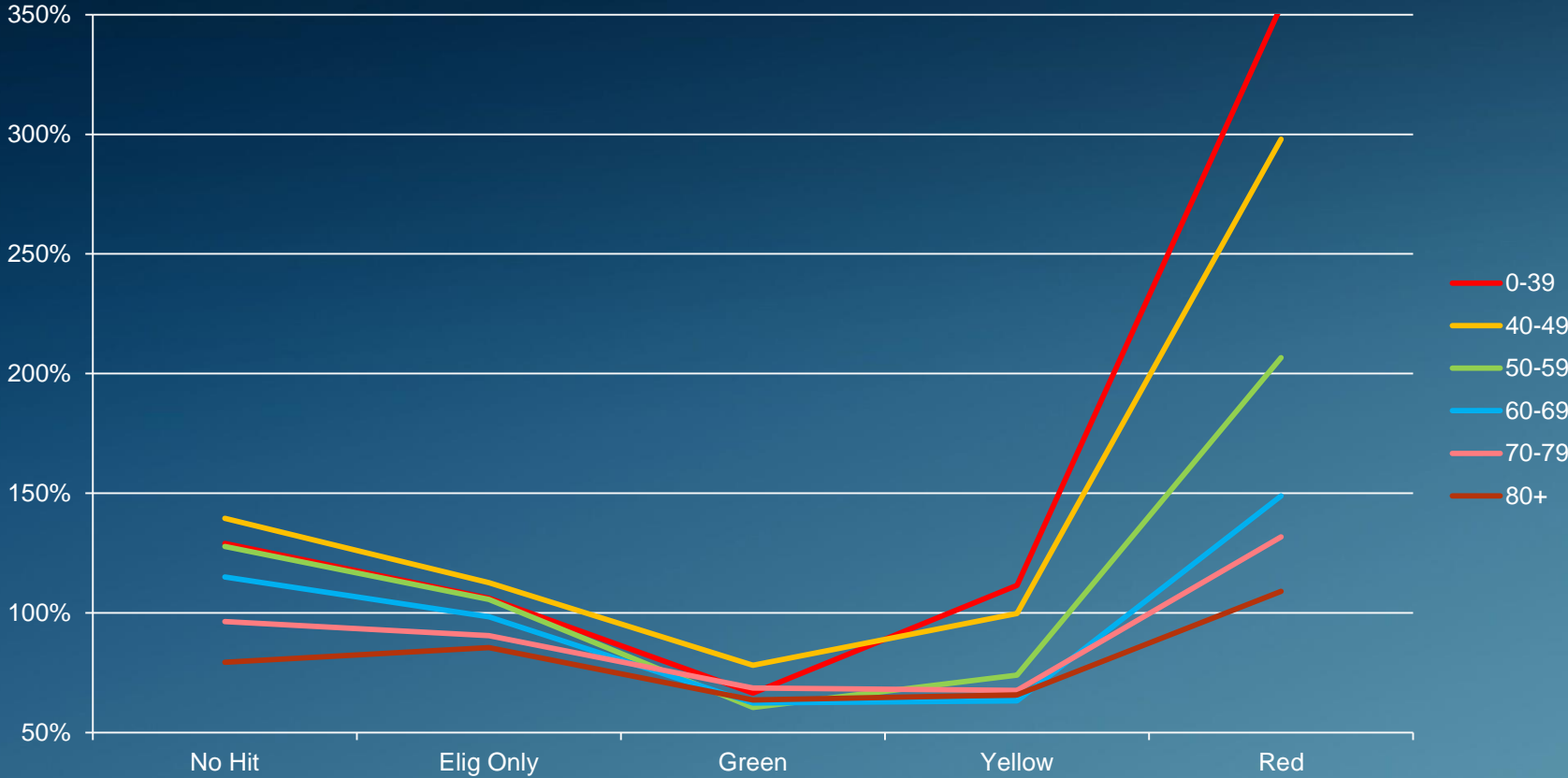


# Why does the curve look like it does?

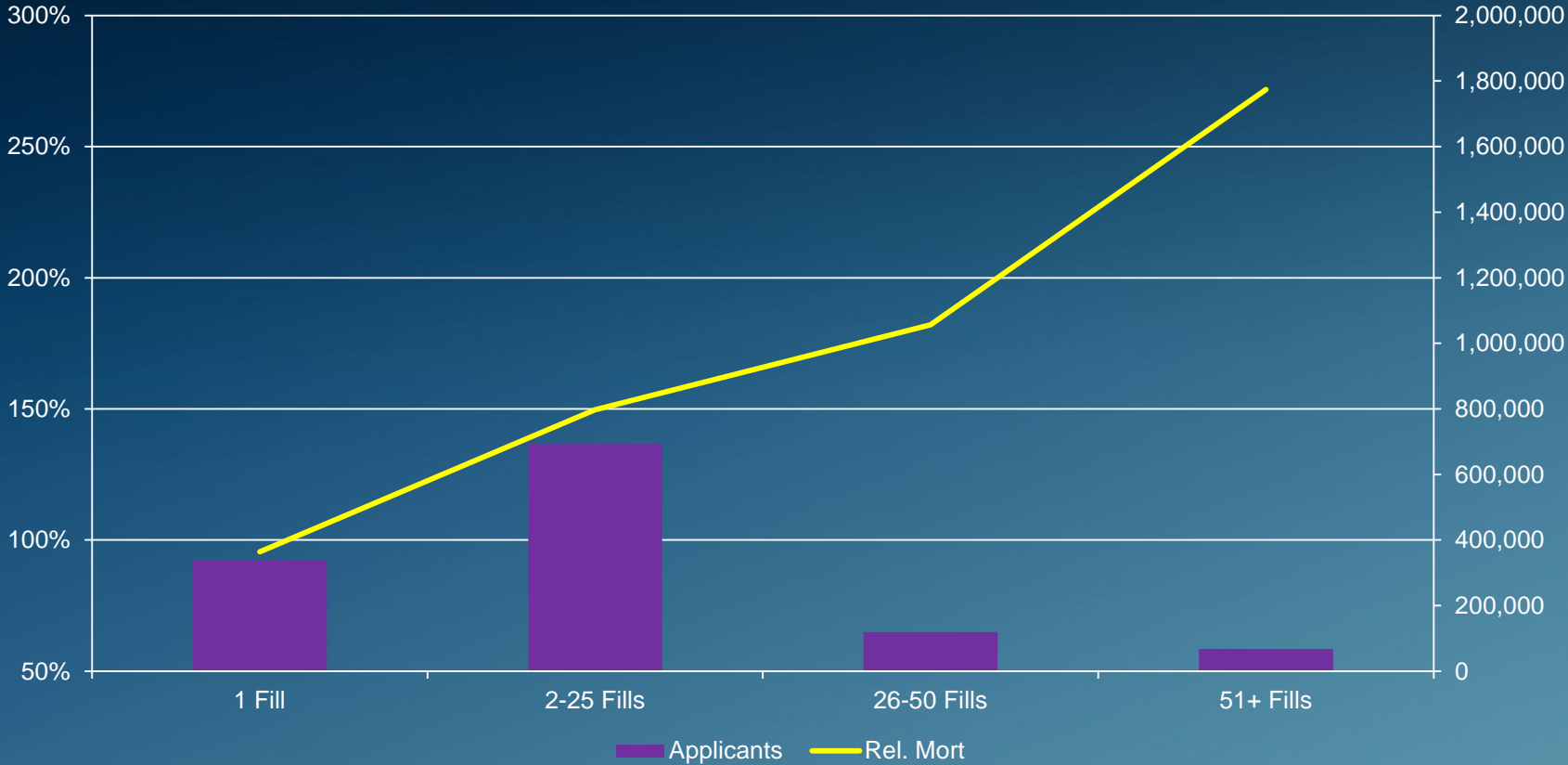
- None – they do not show up in our system
- Eligibility Only – have health care
- Green or Yellow – actively engaged in health care
- Red – higher risk medications



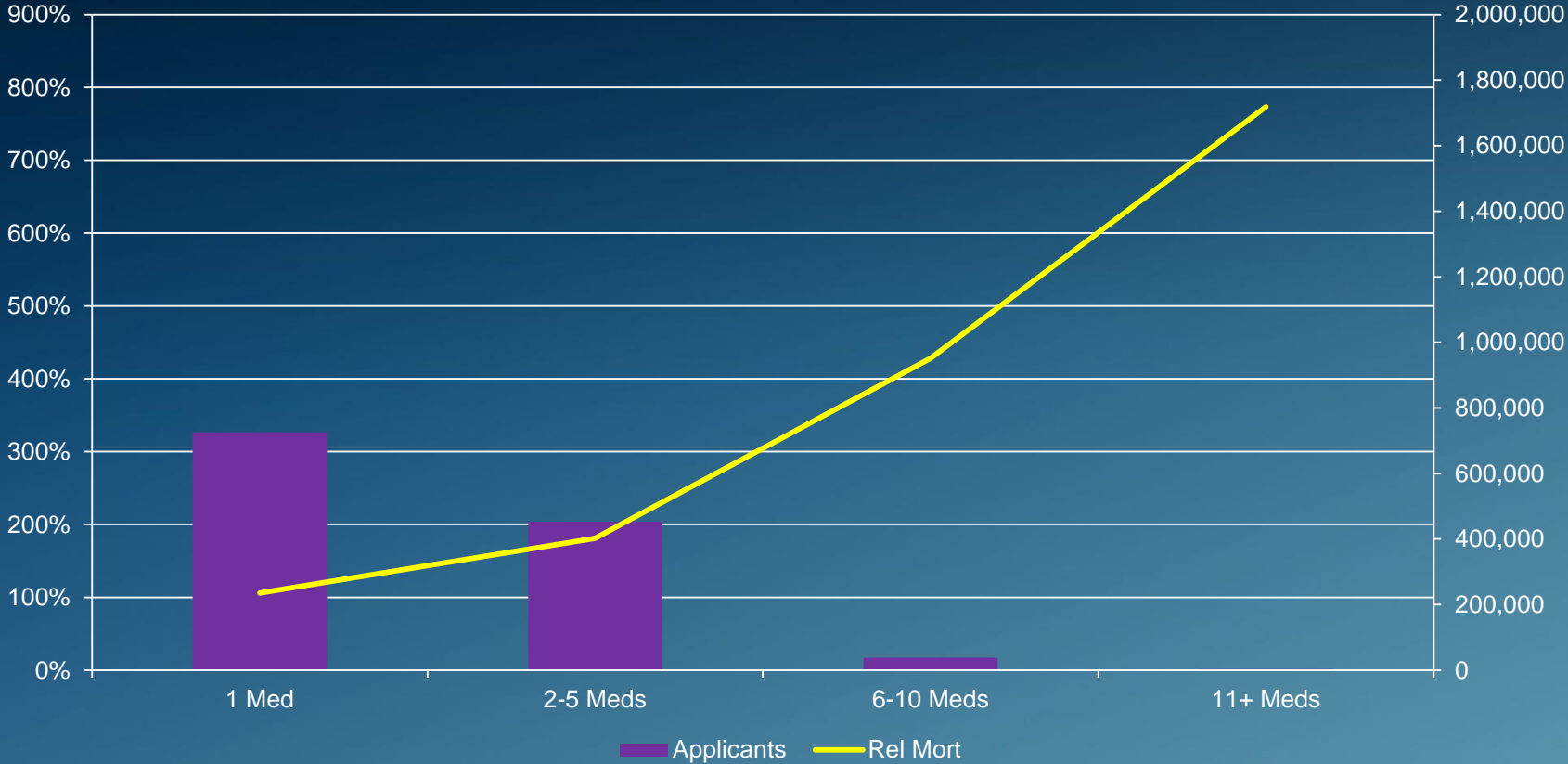
# Relative mortality by age



# Relative mortality by red fill count



# Relative mortality by distinct red medication



# Drug results

- Expected drug results
  - Antihistamines – 105%
  - Penicillins – 92%
  - Prenatal vitamins – 103%
  - Antipsychotic / Antimanic – 281%
  - Insulin – 310%
  - Phosphate binders – 750%

# Drug results

- Unexpected drug results
  - Antacids – 296%
    - Aluminum & Magnesium Hydroxide – 331%
    - Calcium Carbonate – 192%
  - Water soluble vitamins – 234%
    - Vitamin B-1 – 671%
    - Vitamin C – 176%
  - Sorbitol – oral vehicle – 502%



# Drug results

- Unusual drug results
  - Adhesive tape – 721%
    - Only 5 deaths
    - Perhaps some type of wound care
  - Condoms – 710%
    - Only 9 deaths, 8 of which are females
    - Primarily covered under Medicaid

# Drug mapping conclusions

- Overall – Red, Yellow, Green mapping works!
- Combines top down clinical view of underwriting with bottom up evidence based results analysis
- Can be tailored for company or product specifics

# Protective value everywhere

- Myth
  - Use Rx histories only at older ages
  - Use Rx histories only at younger ages
- Fact
  - Client data: mortality savings far exceed costs at all ages

# Protective value everywhere

- Myth
  - Use Rx histories only at smaller face amounts
  - Use Rx histories only at larger face amounts
- Fact
  - Client data: mortality savings far exceed costs at all face amounts

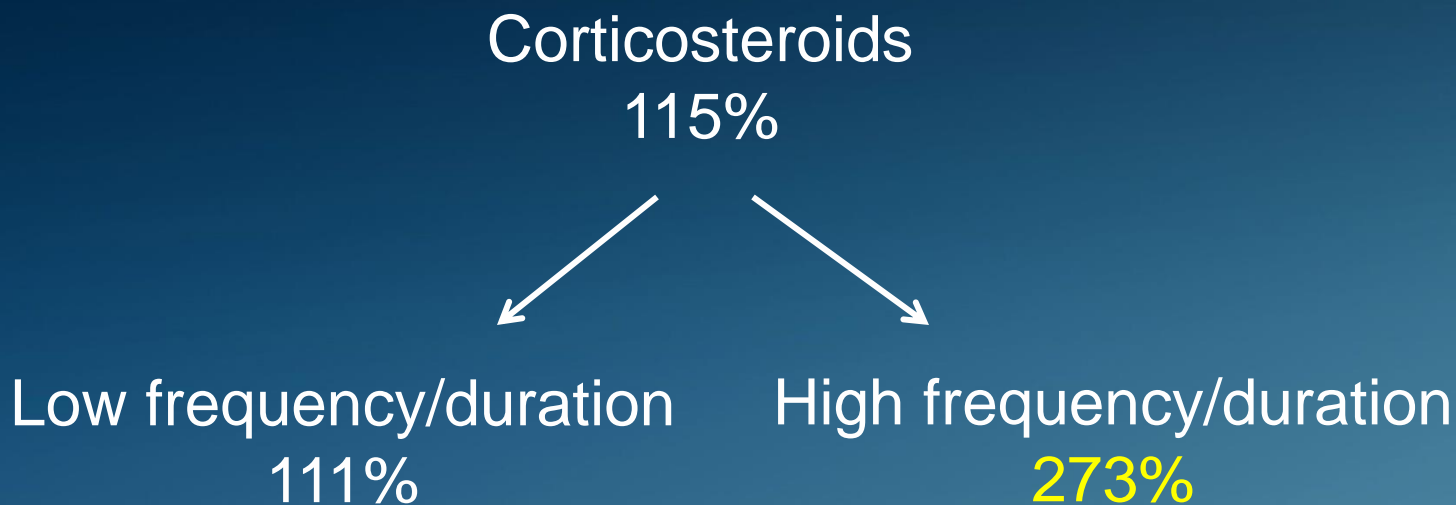
# Rx rules engine

- Consistent interpretation of Rx fills
- Drug combinations and usage patterns
- Incorporate additional details from the Rx fill
  - Dosage
  - Timing and duration
  - Physician specialty
- Focus u/w resources where needed

# Rx rules engine example – general

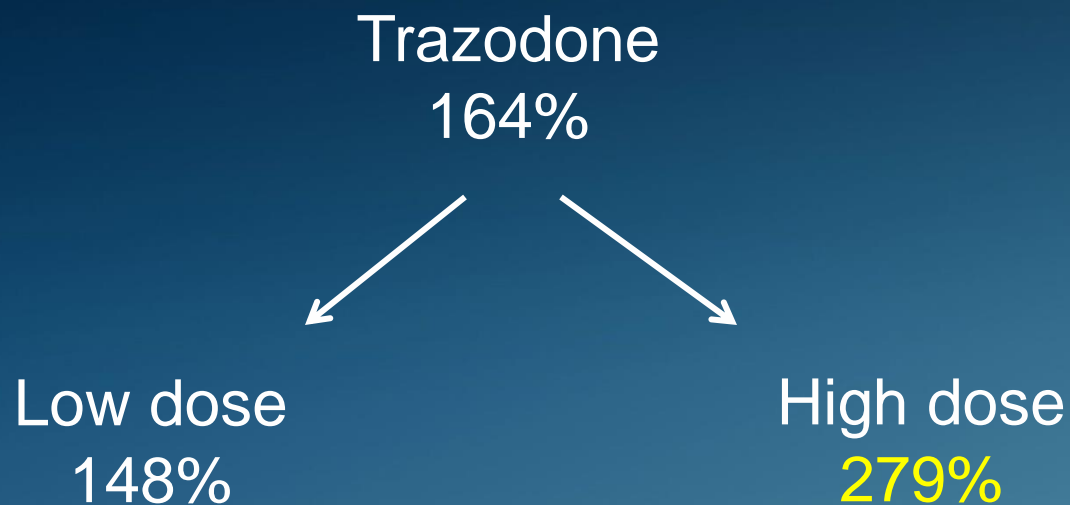
- Non-Insulin dependent diabetes – 115%
- Insulin dependent diabetes – 260%

# Rx rules engine – timing and duration matter



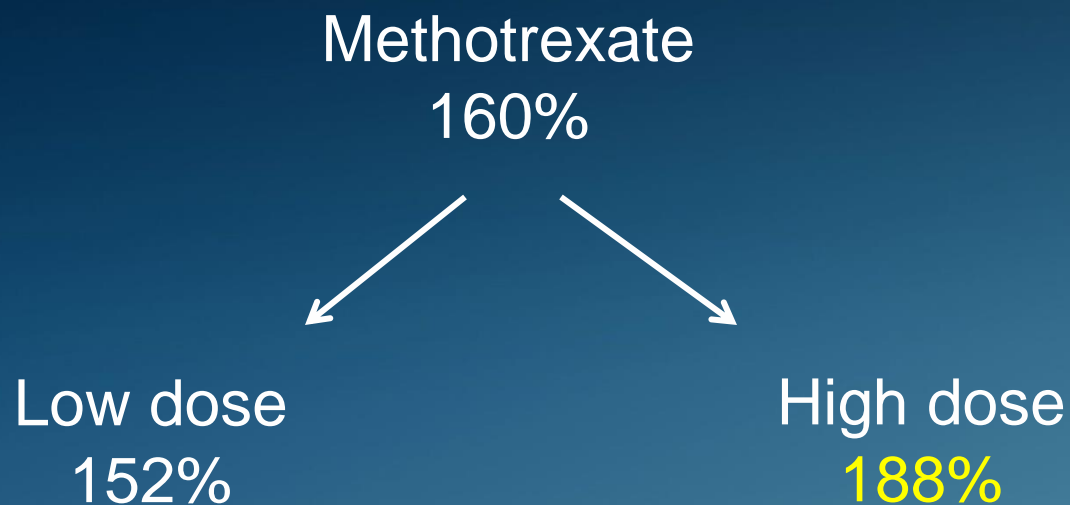
Corticosteroids are very common among insurance applicants

# Rx rules engine – dosage matters





# Rx rules engine – dosage matters



# Rx rules engine – drug combinations matter

Spironolactone

276%



**With 2 out of 3 of:**

Thiazide Diuretics (116%)  
Ace / Angio II (ARBS) (122%)  
Beta Blocker (130%)

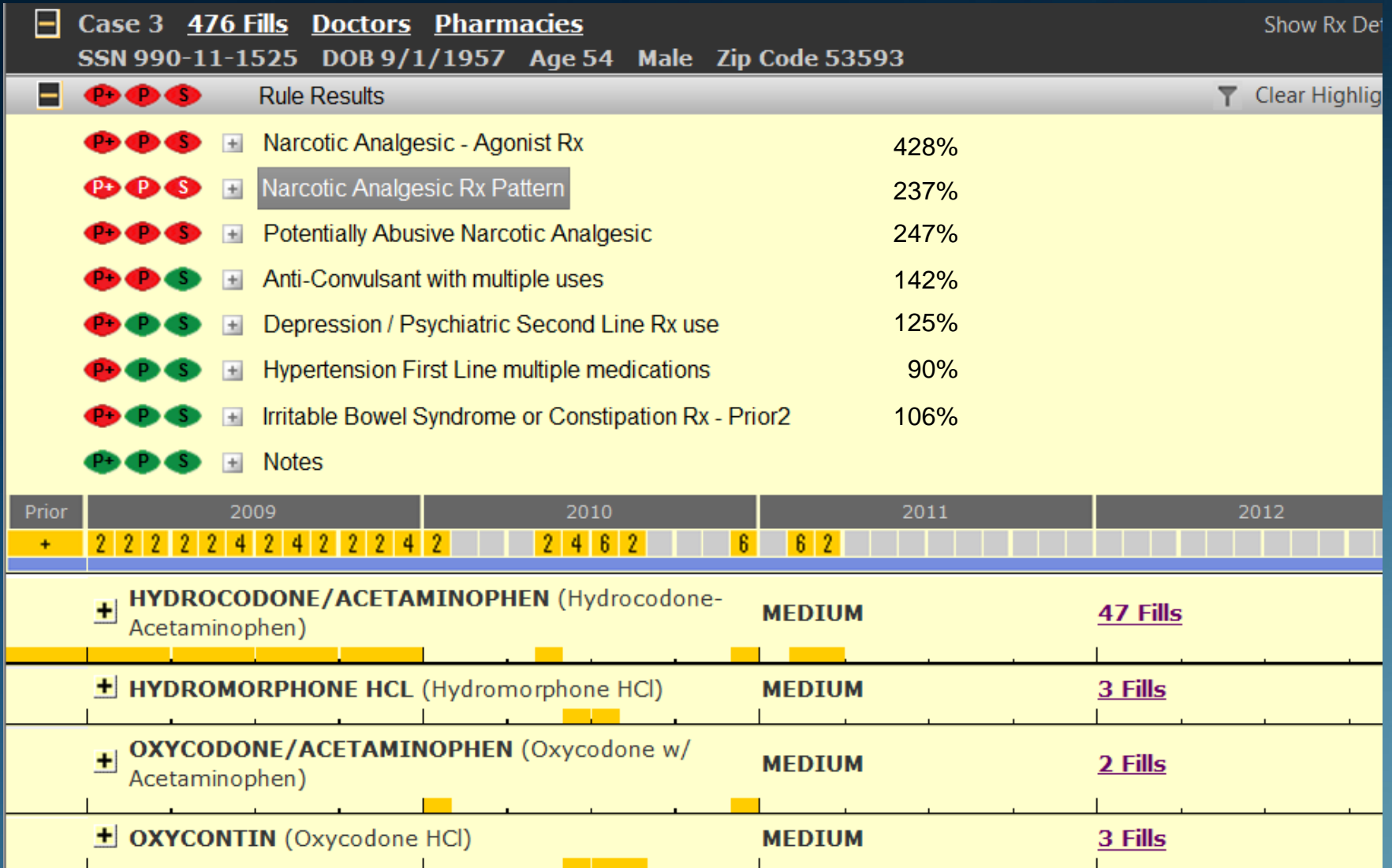
**357%**

**Without 2 out of 3 of:**

Thiazide Diuretics (116%)  
Ace / Angio II (ARBS) (122%)  
Beta Blocker (130%)

**212%**

# Mortality results support RxRules decisions.



# Thank You

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