



Prescription History Mortality Study

November 21, 2013

Southeastern Actuaries Conference

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The bottom right corner of the slide features the Milliman IntelliScript logo, consisting of the Milliman logo and the word "IntelliScript" in blue.

Agenda

- Prescription history ordering and usage
- Mortality study background and metrics
- Mortality study results
- Drug results review
- Evidence based Rx rules engine

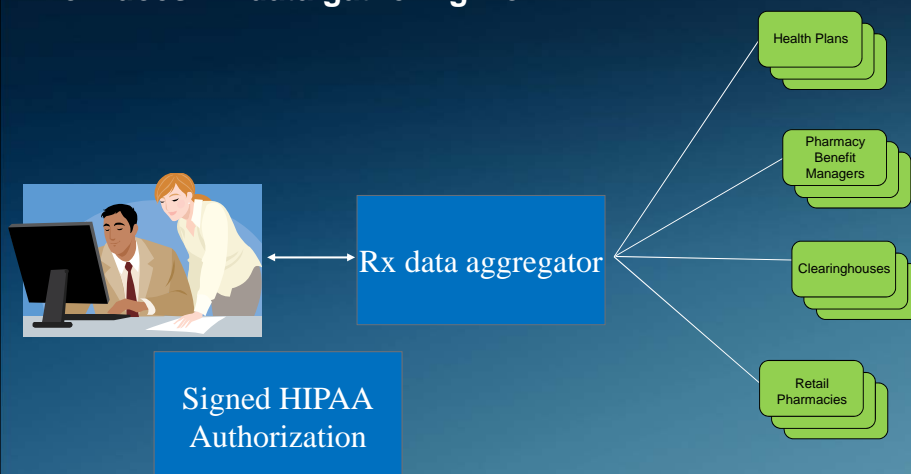
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How does Rx data gathering work?



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Prescription history adoption is increasing.

Survey of Life insurers:

- Usage: 41% in 2007 . . . 77% in 2012
- 71% reported increased use of Rx
- Rx histories significantly impact decisions



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

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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

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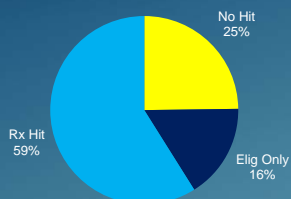
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Metrics

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



Distribution of Applicants



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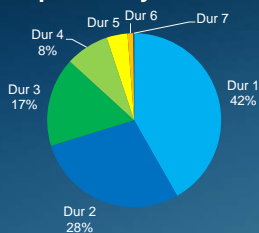
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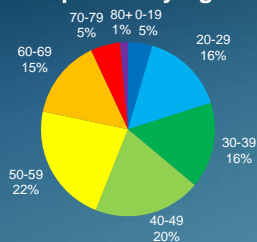
Metrics

- 21.2M Exposure Years

Exposure by Duration



Exposure by Age



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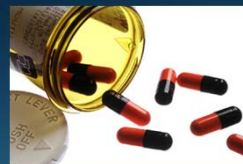
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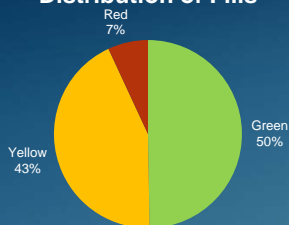
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Metrics – highest drug level

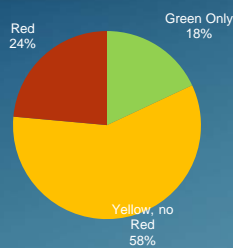
- 6.1M Applicants with at least one fill
- 275M Total fills



Distribution of Fills



Applicants with at least one fill



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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

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Relative mortality example

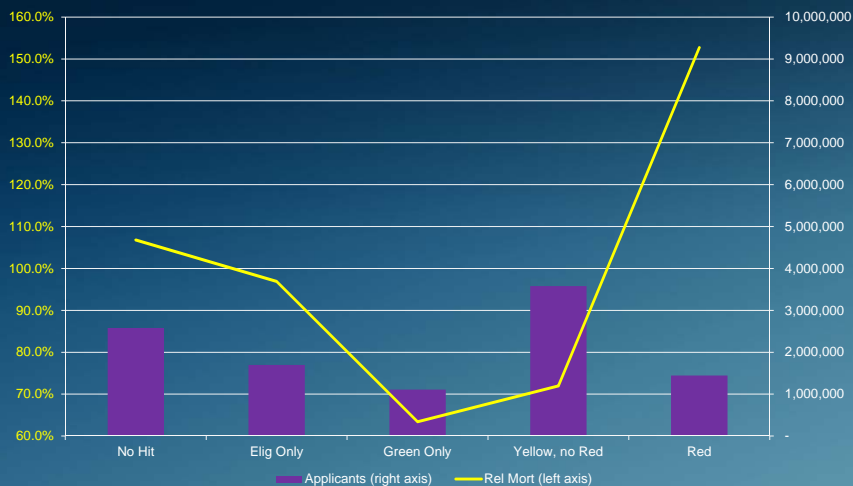
- Applicants who took the drug warfarin sodium died at a rate of 176% of the overall population of applicants
- Calculated as A/E for sub group divided by A/E for entire population of 10.4m applicants

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Relative mortality by status



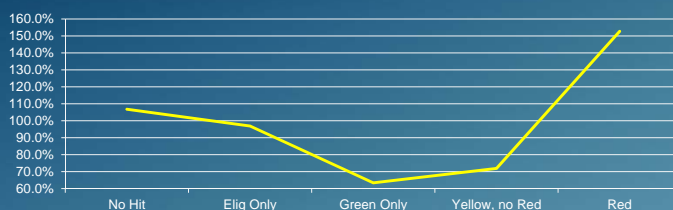
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Why does the curve look like it does?

- 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



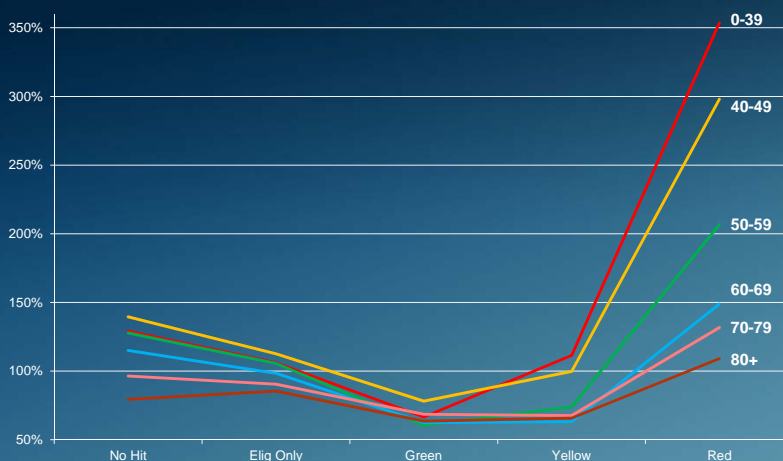
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Relative mortality by age



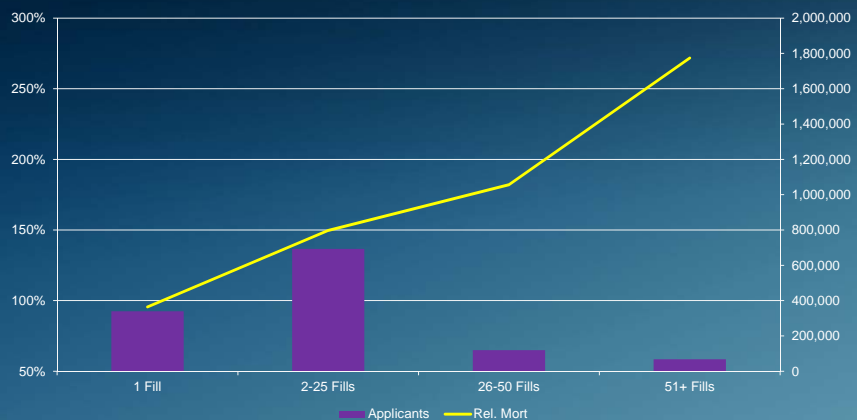
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Relative mortality by red fill count



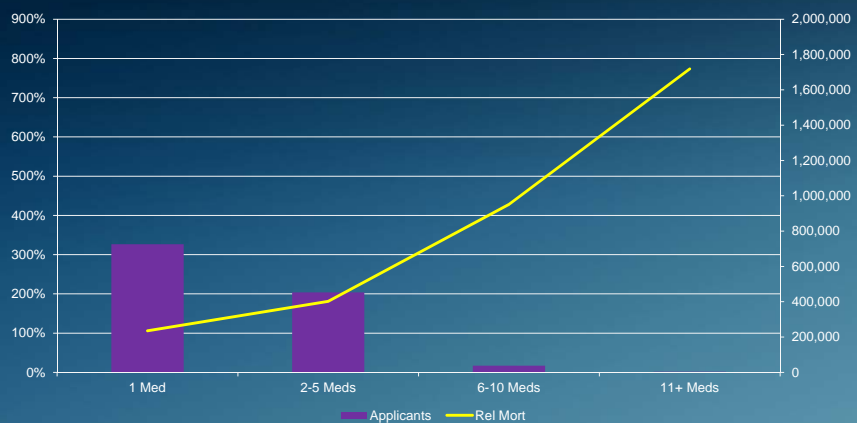
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Relative mortality by distinct red medication



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Drug by drug relative mortality

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

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Drug by drug relative mortality

- *Unexpected 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%

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Drug by drug relative mortality

- *Unusual 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

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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

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Protective value everywhere

- Myth
 - Use Rx histories only at older ages
 - Use Rx histories only at younger ages
- Fact
 - Mortality savings at all ages

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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 at all face amounts

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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

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Rx rules engine example – general

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

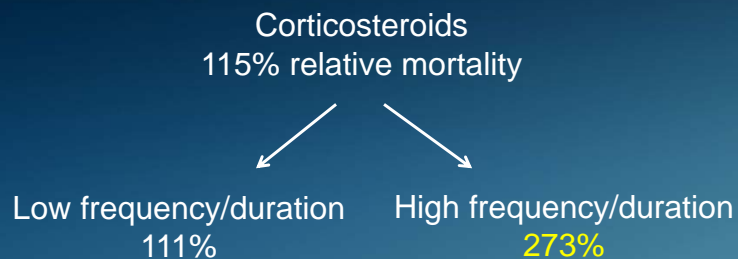
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Rx rules engine – timing and duration matter



Corticosteroids are very common among insurance applicants

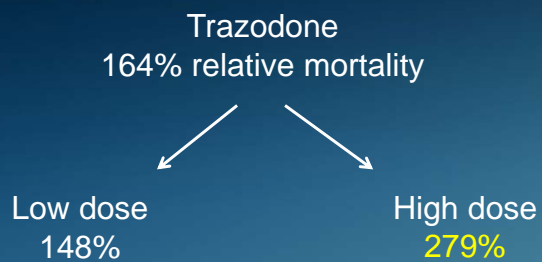
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Rx rules engine – dosage matters



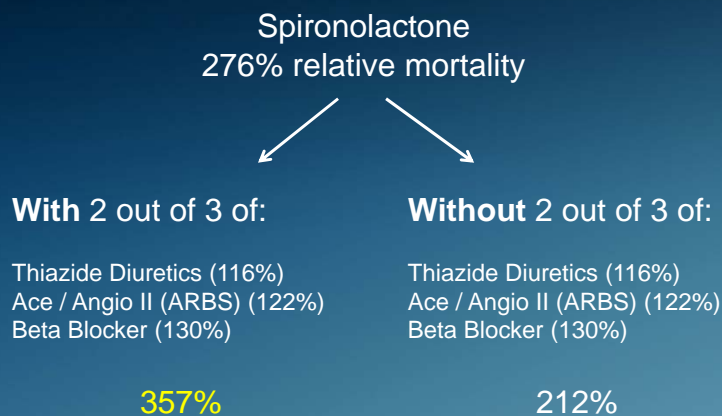
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Rx rules engine – drug combinations matter



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Next steps and other uses

- Next steps
 - Update with 2012 deaths
 - Refine Rx rules engine
- Other uses
 - Inforce/block life analysis – de-identified data

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