



somewhat  
different

# Mind the Gap

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## Meeting Expectations

- Holes in the Underwriting Process
- Anti-selection
- Program monitoring similarities to cost benefit studies
- Smoker correlations
- Magnitude of risk
- Non-random sampling

## Meeting Expectations

- Cost-benefit studies
- Accelerated underwriting programs

# Are There Holes in the Underwriting Process?



# Mind the Gap!

Is it the Step or the Gap  
that matters?



# The Process of Underwriting

- ▶ All underwriting processes contain holes
- ▶ Think about application Part II questions: did you ask about every disease known to mankind?
  - No
- ▶ Will fluids uncover all unadmitted diseases?
  - No
- ▶ Common questions: Is there anything else that could be used to underwrite?
  - Other preferred risk factors?
  - Surrogate markers (NT-proBNP vs EKG)
  - New risk variables

# Collecting Information

Mortality Risk can be classified with minimal information

- All diabetics = Table 4

The idea that the underwriter needs more information, is not necessarily true

- The underwriter needs more information to refine their risk class

The industry risk: Someone takes it a step further and cherry picks the best risks

- Example: Impaired risk brokerage underwriting

# The Process of Underwriting

- ▶ Cost-benefit studies are very similar to program monitoring
- ▶ In both cases, identify the risk class and requirement that got you there
- ▶ The misbelief that it's just a matter of collecting enough information, at time of application to stratify risk, misses the antiselective component



# Accelerated Underwriting

- ▶ This presentation will focus on monitoring accelerated underwriting programs
- ▶ There can be surprise findings associated with an accelerated underwriting program just like in cost-benefit analysis

# Accelerated Underwriting Programs

New Accelerated Underwriting Programs include back testing

Goal: to identify mortality slipping through

Important to understand how to monitor these programs

Random Hold Out (RHO)

APS

# Sources of Surprise Findings

- ▶ Look at the surprise findings and determine if they were
  - Misrepresented perhaps withheld intentionally
  - Found on exam as a surprise finding
- ▶ We define value of additional underwriting requirements based on surprise findings from the perspective of the underwriter's desk top
- ▶ Surprise finding means, until receipt of requirement, we didn't know that impairment existed

In reality, people don't admit to everything

Other than medical professionals, most people don't completely understand the finer nuances of their medical history

People may have risks that even they do not know about

# Early Warning

- ▶ Many feel it takes years before you know if you got it right
- ▶ In reality, you can monitor immediately
- ▶ In traditional protective value studies, the mortality assigned by the underwriter is presumed to play out many years into the future (actuaries and underwriters) conduct present value calculations to roll the future mortality back into today's dollars
- ▶ Simply put, early warning analysis can be performed today and ramifications quantified

# Smoking Research

- ▶ Hot topic in the industry
- ▶ Data emerging on smoker non-disclosure



# Smoking

- ▶ What percent of the US population smokes?
  - As of this 2009 publication, 20.6% of US Population
- ▶ Does that vary by anything?
  - Results from the Morbidity and Mortality Weekly Report MMWR<sup>1</sup>

TABLE. Percentage of persons aged ≥18 years who were current cigarette smokers,\* by selected characteristics — National Health Interview Survey, United States, 2009

Characteristic	Total (N = 27,603)		Men (n = 12,193)		Women (n = 15,410)	
	%	(95% CI)	%	(95% CI) <sup>†</sup>	%	(95% CI)
<b>Education<sup>††</sup></b>						
0–12 yrs (no diploma)	26.4	(24.5–28.3)	30.5	(27.6–33.5)	22.2	(19.9–24.5)
≤8 yrs	17.1	(14.5–19.6)	22.2	(18.0–26.4)	11.9	(9.2–14.7)
9–11 yrs	33.6	(30.7–36.5)	36.5	(32.2–40.9)	30.5	(26.6–34.4)
12 yrs (no diploma)	28.5	(23.2–33.9)	34.1	(26.0–42.1)	23.3	(17.0–29.6)
GED <sup>§§</sup>	49.1	(44.5–53.8)	53.2	(46.6–59.8)	44.7	(38.2–51.2)
High school graduate	25.1	(23.6–26.5)	29.0	(26.9–31.2)	21.5	(19.8–23.3)
Some college (no degree)	23.3	(21.7–24.9)	26.1	(23.4–28.8)	21.0	(19.0–22.9)
Associate degree	19.7	(17.9–21.5)	20.6	(17.5–23.6)	19.1	(16.5–21.6)
Undergraduate degree	11.1	(10.0–12.3)	12.4	(10.7–14.2)	9.9	(8.3–11.4)
Graduate degree	5.6	(4.6–6.6)	4.9	(3.6–6.3)	6.3	(4.7–7.9)

<sup>1</sup>MMWR. September 10, 2009; Vol. 59, No. 35

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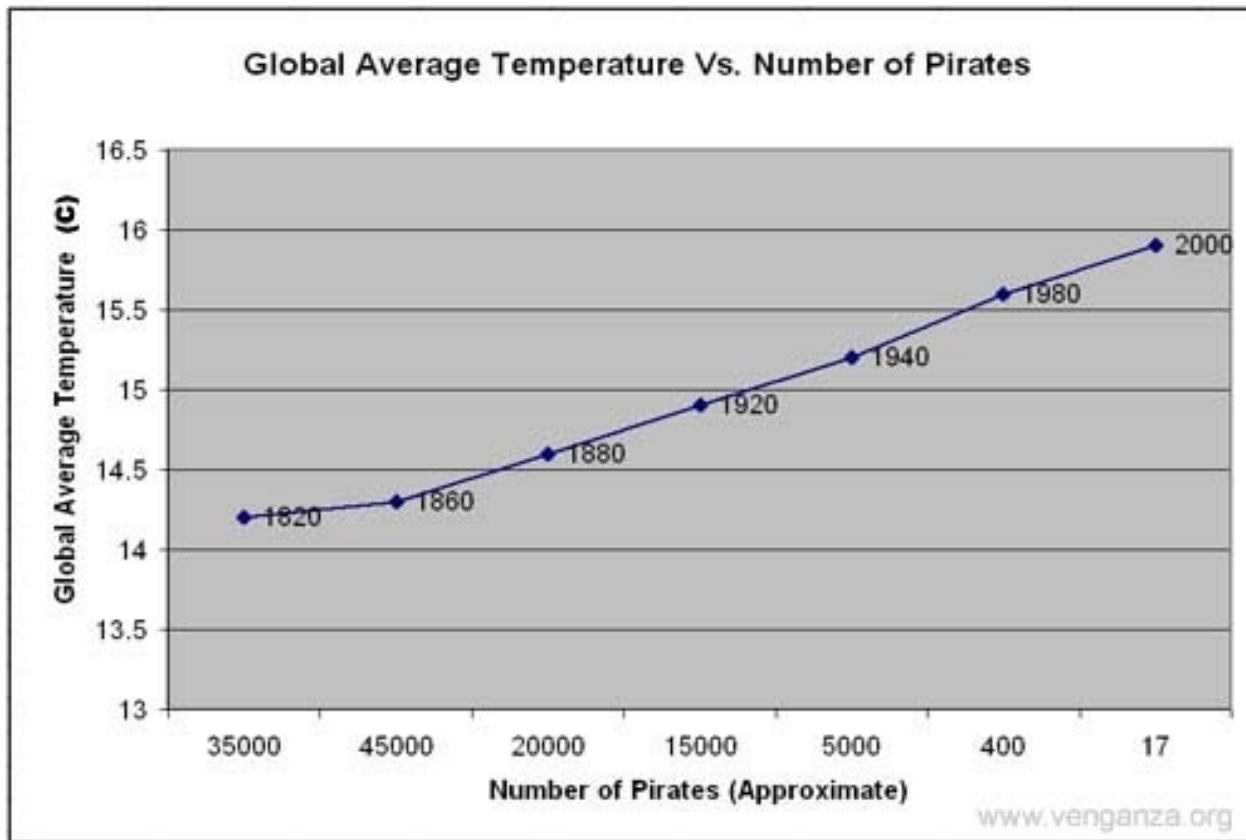
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# Correlation Does Not Necessarily Mean Causation

A pirate shortage caused global warming



[https://www.buzzfeed.com/kjh2110/the-10-most-bizarre-correlations?utm\\_term=.qmeJ68L8O#.yugzGEMeE](https://www.buzzfeed.com/kjh2110/the-10-most-bizarre-correlations?utm_term=.qmeJ68L8O#.yugzGEMeE)



# Smoking Prevalence

- ▶ Kaiser Health News report published May 4, 2016 by Phil Galewitz states: “Smokers’ Ranks Look Conspicuously Sparse In Obamacare”

State	% of state population who smoke	% of Obamacare Enrollees who admit to smoking
Florida	17%	4%
Kentucky	27%	11%
Mississippi	25%	9%
New Jersey	16%	6%
Idaho	17%	3%
Wyoming	21%	6%

<http://khn.org/news/smokers-ranks-look-conspicuously-sparse-in-obamacare/>

# Smoking Data Journal Ins Med 2014

**Table 2a.** Urine Cotinine Confirmation by Self-Reported Status

Self-Reported Tobacco Status	Urine Confirmation		Totals
	Cotinine Negative	Cotinine Positive	
Non-User	5,138,248	105,452	<b>5,243,700</b>
User	498,426	440,518	<b>938,944</b>
<b>Totals</b>	<b>5,636,674</b>	<b>545,970</b>	<b>6,182,644</b>

Sensitivity = (Cotinine-Positive Self-Reported Users)/(All Cotinine Positives) = 80.7%

FNSR = (Cotinine-Positive Self-Reported Non-Users)/(All Cotinine Positives)=19.3%

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FNSR = (Cotinine-Positive Self-Reported Non-Users)/(All Cotinine Positives)=19.3%

# Smoking Data Journal Ins Med 2014

Reported	Cot Neg	Cot Pos
Non-Smokers	5,138,248	105,452
Smokers	498,426	440,518

Smokers, admitting to tobacco use, were more likely to be cotinine negative, than cotinine positive

Reported	Cot Neg	Cot Pos	Total
Smokers	498,426	440,518	938,944
%	53%	47%	100%

# Smoking Data Journal Ins Med 2014

- ▶ FNSR (False Negative Self-Reporting) (*aka liars*), can only be found by cotinine testing....
- ▶ The total smoker class is defined as “all cotinine positive applicants”
- ▶ That reduces the size of the smoker class, defined in this manner, the surprise hits are a larger percentage of the total smoker class
- ▶ At the same time, that also suggests there are probably liars getting away with lying, because the cotinine test doesn't find smokers more than half the time (53%)

# Find How Many and How Big

- ▶ How many?
  - Count everyone with a mortality deviation from their issued class
  - Keep track of what percent of the total that represents
- ▶ How Big?
  - Quantify the size of the hit based on the amount of mortality the hit represents
  - Big = Lots of Debits
  - Little = Few Debits
- ▶ Very simply you identify the risk class
  - What was the risk class before
  - What is the risk class after

# BMI

- ▶ Height may be over or under stated
- ▶ Weight may be over or under stated
  
- ▶ The BMI statistic accounts for both height and weight
  - $\text{BMI} = \text{kg/m}^2$
  - $\text{BMI} = 703 \cdot \text{lbs/in}^2$
  
- ▶ Each person receives a personal relative risk factor based on tele-interview BMI and exam BMI

# BMI

- ▶ To quantify the mortality associated with the discrepancy in reported BMI, versus exam BMI, apply results from RHO testing

## The right class

- No difference in mortality

## Issued class is better than the class they should be in

- Mortality will be higher
- How high depends on the debits

## Issued class is worse than the class they should be in

- Mortality will be lower
- How much depends on the credits



# BMI

- ▶ The data on the following page is purely hypothetical – but, mathematically correct



# BMI

Debits (%)	Exam BMI Risk Class					
Tele-Int BMI	SupPrf	Prfd	StdP	Std	SubStd	Wtd Avg
SupPrf	0.0%	24.0%	38.7%	82.7%	146.7%	3.7%
Prfd	-19.4%	0.0%	11.8%	47.3%	98.9%	5.1%
StdP	-27.9%	-10.6%	0.0%	31.7%	77.9%	15.2%
Std	-45.3%	-32.1%	-24.1%	0.0%	35.0%	-7.0%
SubStd	-59.5%	-49.7%	-43.8%	-25.9%	0.0%	-7.7%
Total	-1.6%	3.5%	4.0%	20.0%	20.8%	3.9%

Prevalence (%)	Exam BMI Risk Class					
Tele-Int BMI	SupPrf	Prfd	StdP	Std	SubStd	Grand Total
SupPrf	46.6%	5.0%	1.0%	0.1%	0.2%	52.9%
Prfd	3.3%	12.1%	4.0%	2.5%	0.1%	22.0%
StdP	0.3%	1.8%	6.1%	2.0%	1.9%	12.1%
Std	0.1%	0.7%	0.8%	1.4%	0.6%	3.6%
SubStd	0.1%	0.2%	0.4%	1.5%	7.2%	9.4%
Grand Total	50.4%	19.8%	12.3%	7.5%	10.0%	100.0%

# Over Sample

- ▶ Over sample where you are most concerned
- ▶ If the sample isn't purely random, which it shouldn't be, keep track of how much oversampling occurred
  - Convert that back to what is anticipated in the overall block
  - Keep the oversample stats and population prevalences

# Selection Process

- ▶ Insurance company receives 10,000 applications
- ▶ 7,000 applications (70%) are on people ages 20-39
- ▶ 3,000 applications (30%) are on people ages 40-60
- ▶ A non-random sample is conducted that focuses on the older ages
  - Out of 100 cases audited:
    - 20 cases audited were ages 20-39 average debits missed 6
    - 80 cases audited were ages 40-60 average debits missed 16
- ▶ The weighted average number of missed debits expected to occur is =  $(6 \times 70\%) + (16 \times 30\%) = 9$  debits as a weighted average

# Additional Monitoring Through Claims Review

- ▶ Claims review should include cause of death analysis
  - Are there certain types of claims showing up at a higher rate than found in the general population?
  - Claims should be reviewed in terms of historic insurance company experience as well as general population experience
  
- ▶ The Holy Grail

▶ A/E

## Summary

Insist on both number of hits and magnitude of each hit

If risk class is used to define magnitude, know the mortality rate for all of the risk classes

Convert the change in risk class into debits or mortality ratios

# Summary - Mind the Gap

## Look for trends

- If there is a continuous increase in a certain type of finding, that suggests close monitoring

## Where results deviate look for antiselection

- Are the risk class errors due to surprise lab findings that would be a surprise to the applicant?
- Are results more likely due to antiselective behavior?

## Keep an eye on the magnitude of the hits

- Pay special attention to big hits



Questions?

