

BIG DATA Driven Innovations in the Life Insurance Industry

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RGA Reinsurance Company

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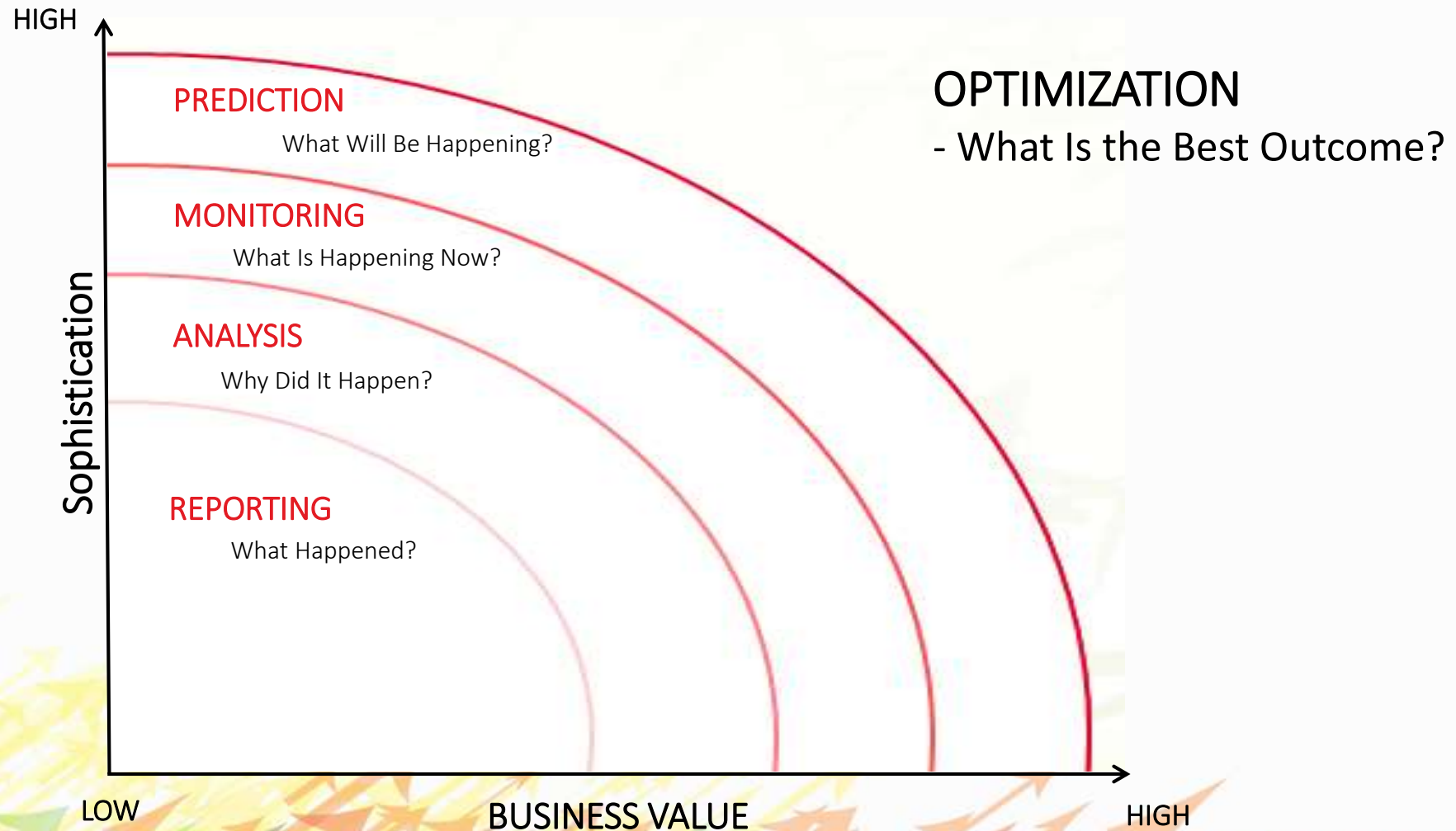
“I keep saying the **sexy** job in the next ten years will be statisticians. People think I'm joking, but who would've guessed that computer engineers would've been the sexy job of the 1990s?”

Hal Varian, Chief Economist at Google (2009)

“It's like an arms race to hire statisticians nowadays...
Mathematicians are suddenly **sexy**.”

Andreas Weigend, former Chief Scientist at Amazon.com (2012)

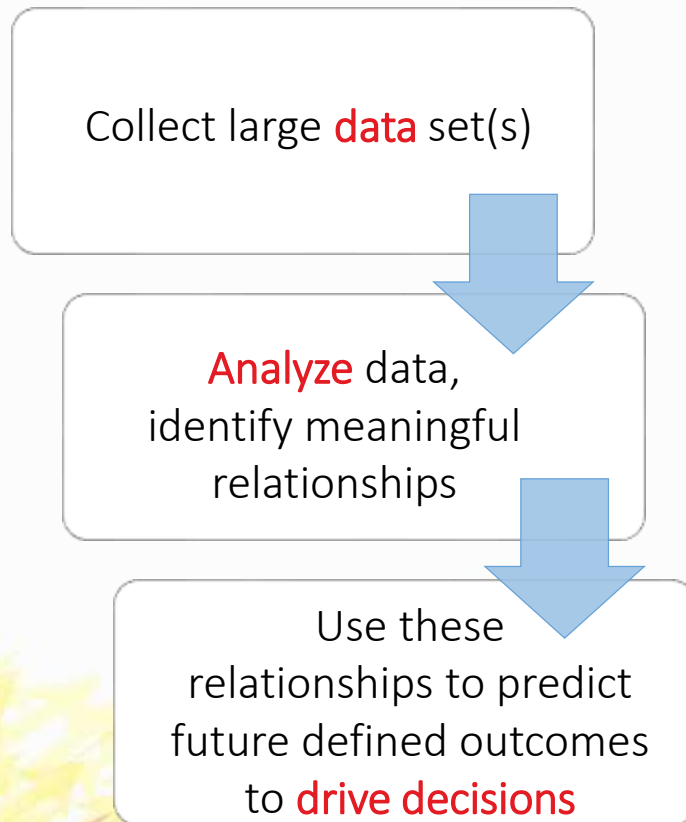
Evolution of Business Intelligence



What is Predictive Modeling?



Put it Simply...



Why bother?

- Uses advanced statistical algorithms to get the most benefit from proprietary data assets.
- Improves the efficiency of existing business processes.
- Provides an advantage that competitors will find it **difficult to replicate**.

Hey! Your Daughter Is Having a Baby!



Source: <http://www.forbes.com/sites/kashmirhill/2012/02/16/how-target-figured-out-a-teen-girl-was-pregnant-before-her-father-did/>

Hey! Your Daughter Is Having a Baby!



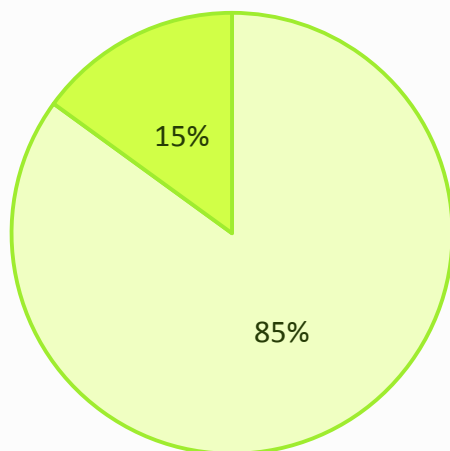
The Target Pregnancy Formula



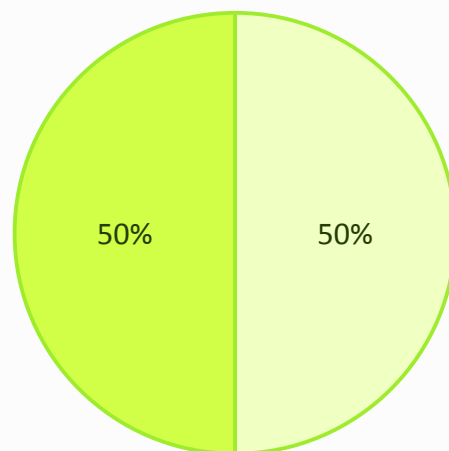
Coming in
mid -Feb!

Life Insurance Is Lagging Behind

**Predictive Modeling
in General Insurance**



**Predictive Modeling
in Life Insurance**



■ Currently using or plan to use ■ No plans

Possible Key Inhibitors

- Lack of management familiarity.
- Product nature (long term & low frequency events).
- Ready access to required data.
- Implementation challenges.
- Insufficient proof of accuracy and case studies.
- Some other priorities and opportunities!

Source:

Towers Watson: Predictive Modeling Proving Its Worth Among P&C Insurers (2012).

Society of Actuaries: Report of the Society of Actuaries Predictive Modeling Survey Subcommittee (2012)

Most Popular Uses of Predictive Modeling for Life Insurance

- Propensity to Buy Models
- Predictive Underwriting models
- Experience Analysis Models
- In Force Retention Models
- Fraud Detection Models
- Agent Quality Assessment Models

Bancassurance Predictive Underwriting

Objectives

- Bancassurer wanting to achieve growth in sales via the bancassurance channel.
- Sell bank customers protection products on a guaranteed issue or simplified issue basis with minimal impact on product price.
- Improve the customer experience by:
 - Issue policies faster.
 - Reduce the UW process for customers most likely to be standard.
 - Easy Identification and targeting of 'good' customers.
 - Make the best use of internal data.



Bancassurance Predictive Underwriting

Predictors

- Demographic (Age, Gender, Location, Branch)
- Asset or Debt Related (Accounts, AUM, TRB)
- Transactional (Bank Account or Credit Purchases)

Two different sets of data...



Response

The underwriting decision when normal underwriting applied:

- Standard risk
- Rated
- Declined

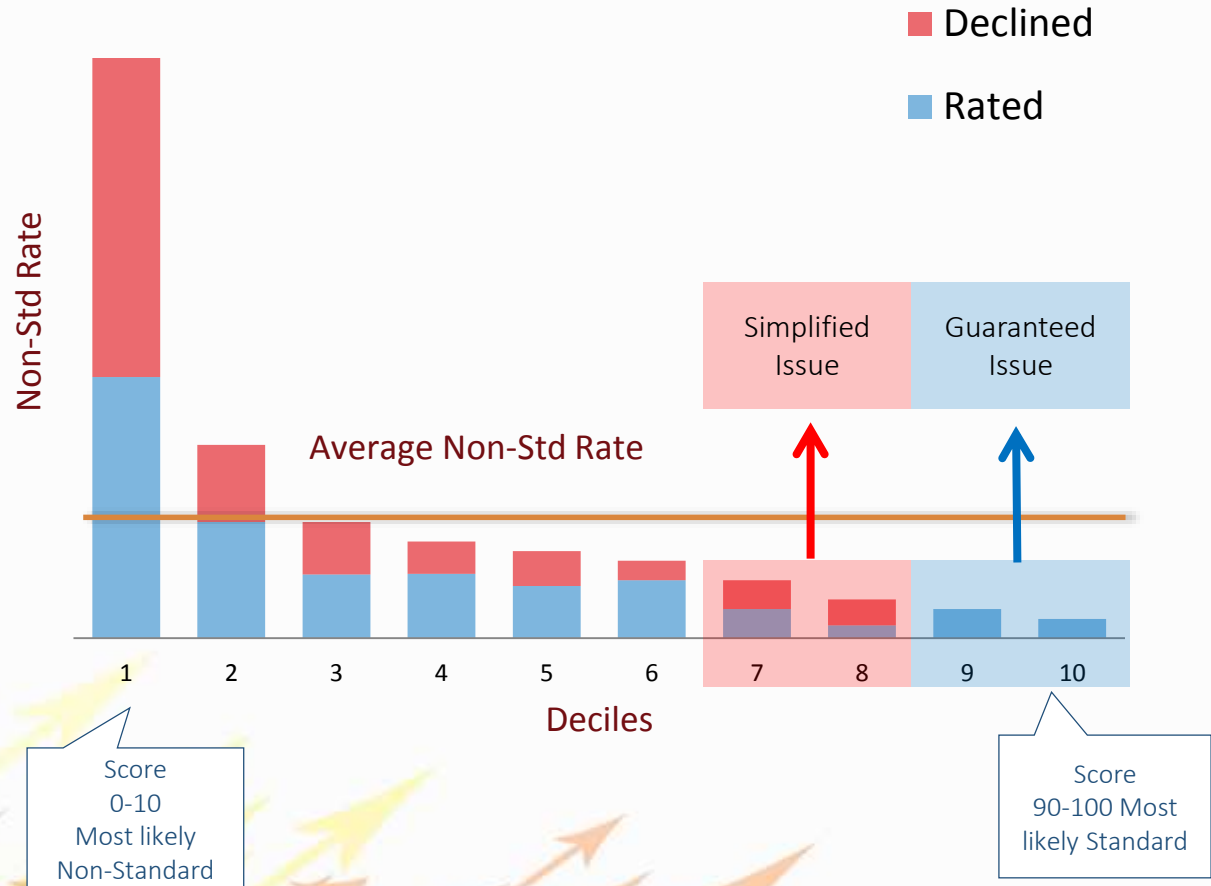
Linked to the same lives

Bancassurance Predictive Underwriting

Lift Plot

Most Predictive Variables

- Marital Status
- Branch
- Assets Under Management
- Customer Segment
- Credit Limit



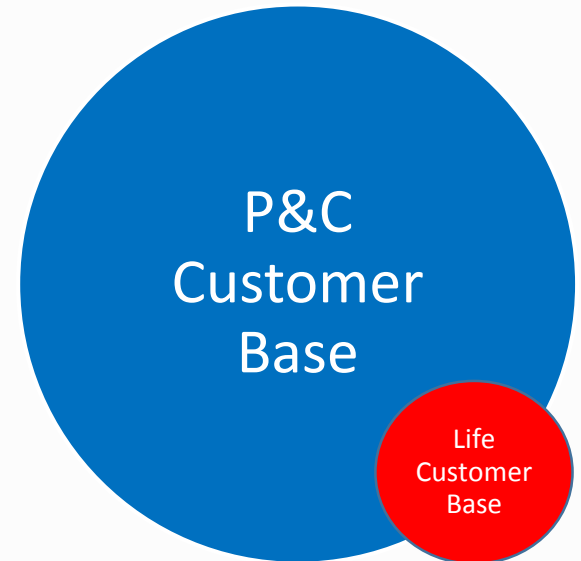
Multi-line Company Cross-sell Model

Background

- A large multi-line company has a very large P&C customer base but low life and living benefit penetration

Objectives

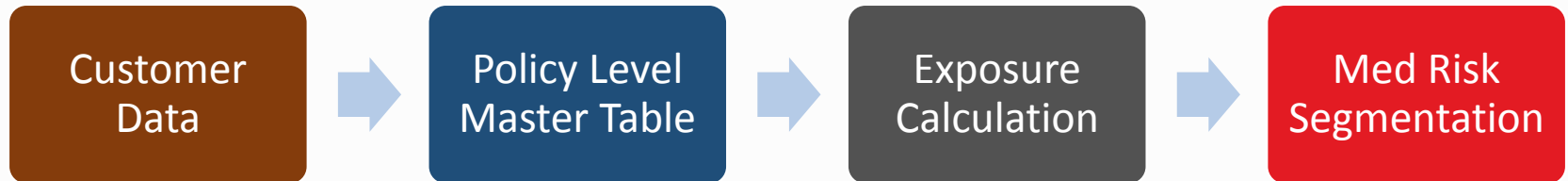
- Increase life and living benefit penetration and leverage data from their large in-force P&C customer base
- Offer a simplified underwriting and sales process with a low rejection rate to the best customers
- Reduce acquisition costs, improve experience, shorten underwriting turn-around time
- Improve persistency of P&C customers as a result of a deeper relationship with clients



Multi-line Company Cross-sell Model

Medical Total Claims Cost Model

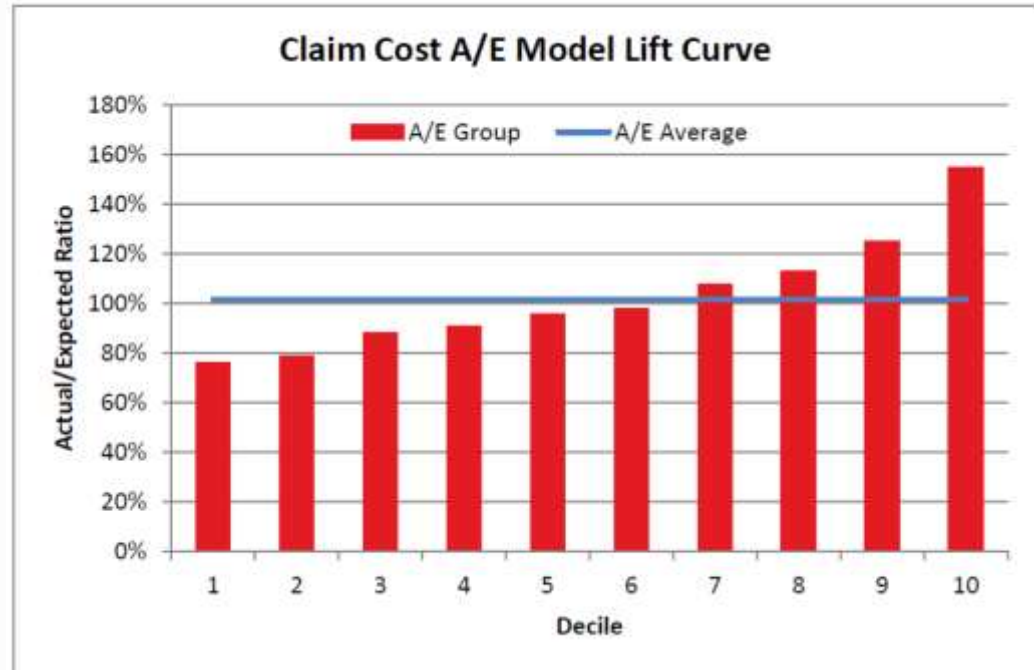
- Identifies P&C customers that are least likely to claim
- Takes into account both the probability to claim and the severity (size) of claims



Multi-line Company Cross-sell Model

Most Predictive Variables

- Region
- Length of P&C
Customer Relationship
- Property Type
- ...



Non-Med Limit Risk Segmentation Model

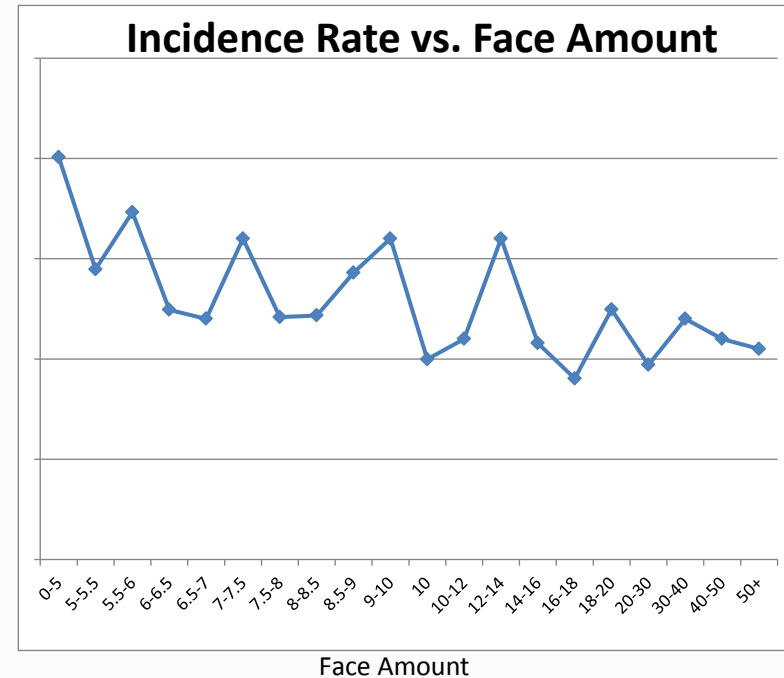
Objectives

Determine optimal non-medical limits that should be used for different customer segments.

Streamline the underwriting process by enforcing more stringent measures for high risks & vice versa.

Identify low risk policyholders for up-sell or cross-sell campaigns.

Understand true drivers of experience to improve decision making.



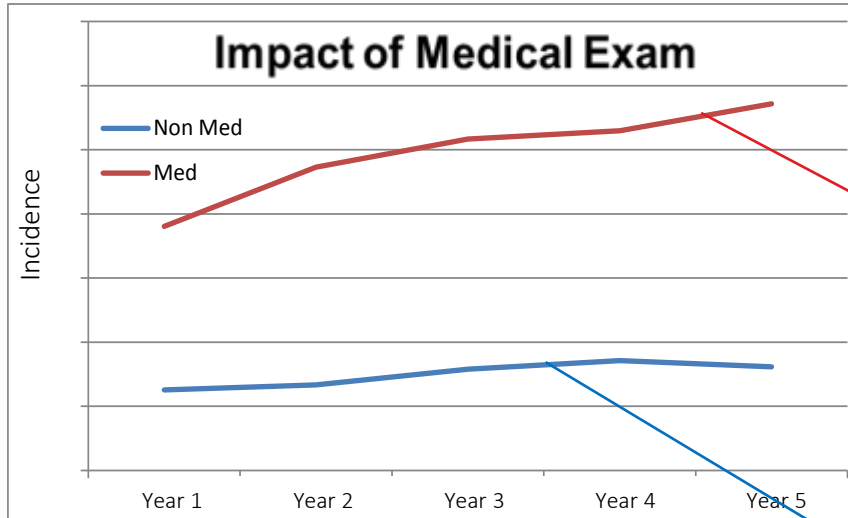
Model Building Process

GLM Model using only insurance company data e.g. age, gender, marital status, occupation, region, agent rating, claims and many other variables.

Data Source	In-force + claims
Study Period	5 years
Product	Life & Accelerated CI
Total Exposure	Around 7m life years
Total Claims	Around 10,000

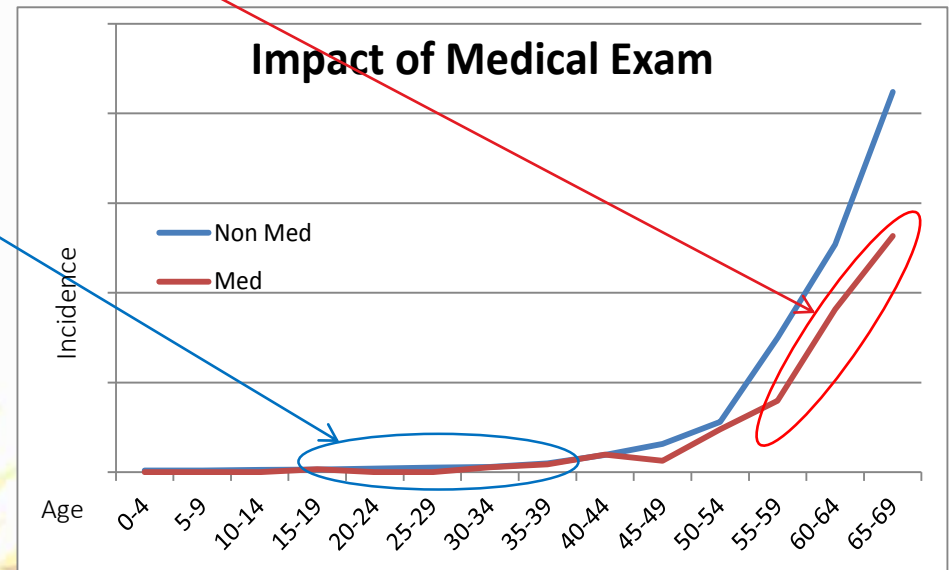
Non-Med Limit Risk Segmentation Model

Effectiveness of Medical Exams



Removing the impact of age helps us understand what is driving the differences in claims experience.

Obvious example of how a univariate analysis doesn't allow us to understand the true drivers of experience.



Non-Med Limit Risk Segmentation Model

Most Predictive Variables

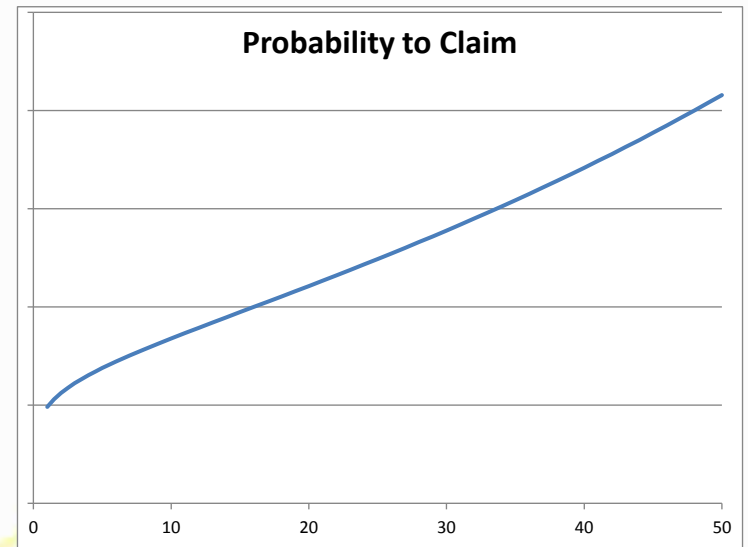
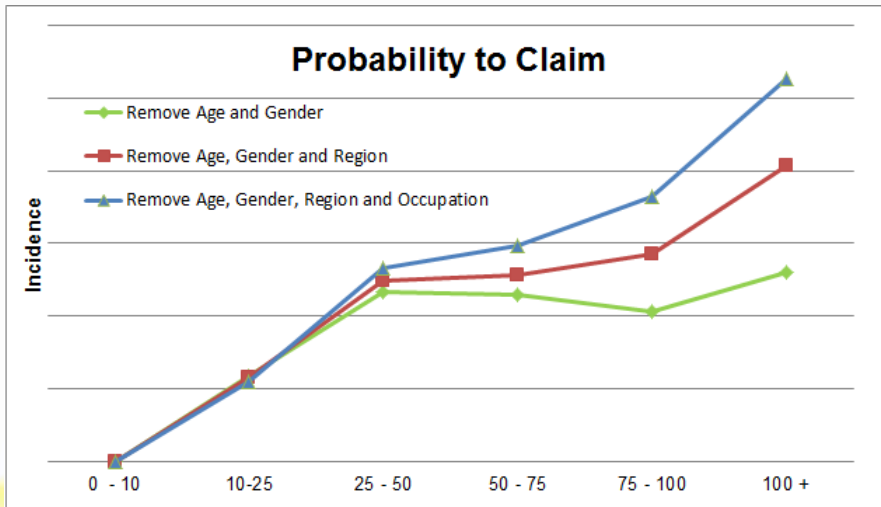
Variable	Type	Impact on claim
Age and Gender	Main/Interaction	age ↑, M ↑ F ↓
Duration	Numeric	↓
Face Amount	Numeric	↑
Insured Smoking Indicator	Binary	Y ↑
Region	Categorical	NE ↑ SW ↓
Relationship to Policyholder	Categorical	Self ↓
Agent Rating	Categorical	

Non-Med Limit Risk Segmentation Model

Probability of claiming increases as face amount increases.

Non-medical limit is necessary to help control risks.

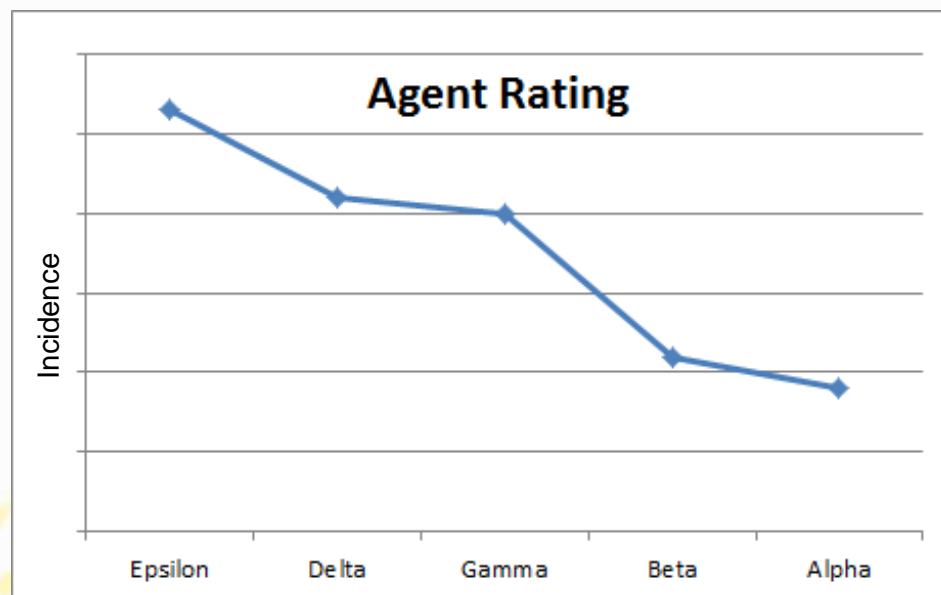
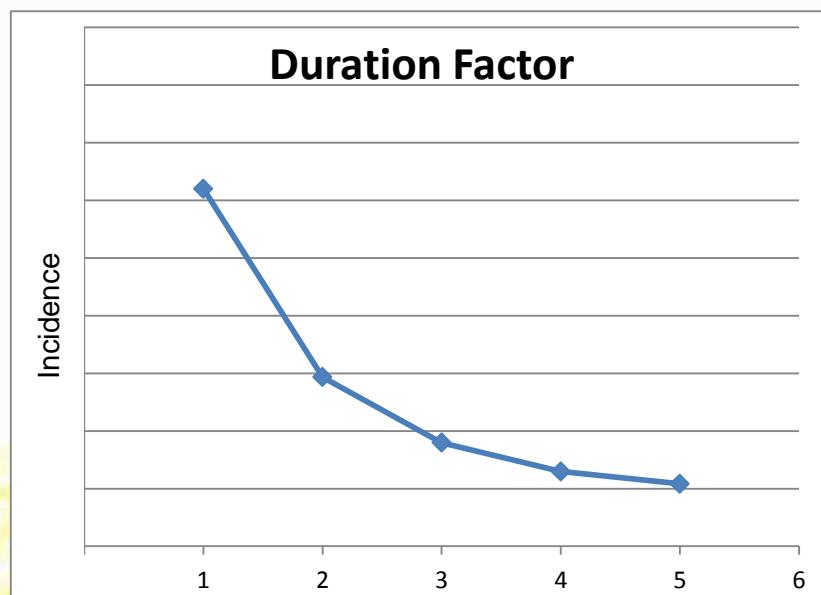
Anti-selection appears to be the dominating force up to the NML limit.



Non-Med Limit Risk Segmentation Model

By Duration: Incidence rates reduce as policy duration increases which indicates severe anti-selective behavior.

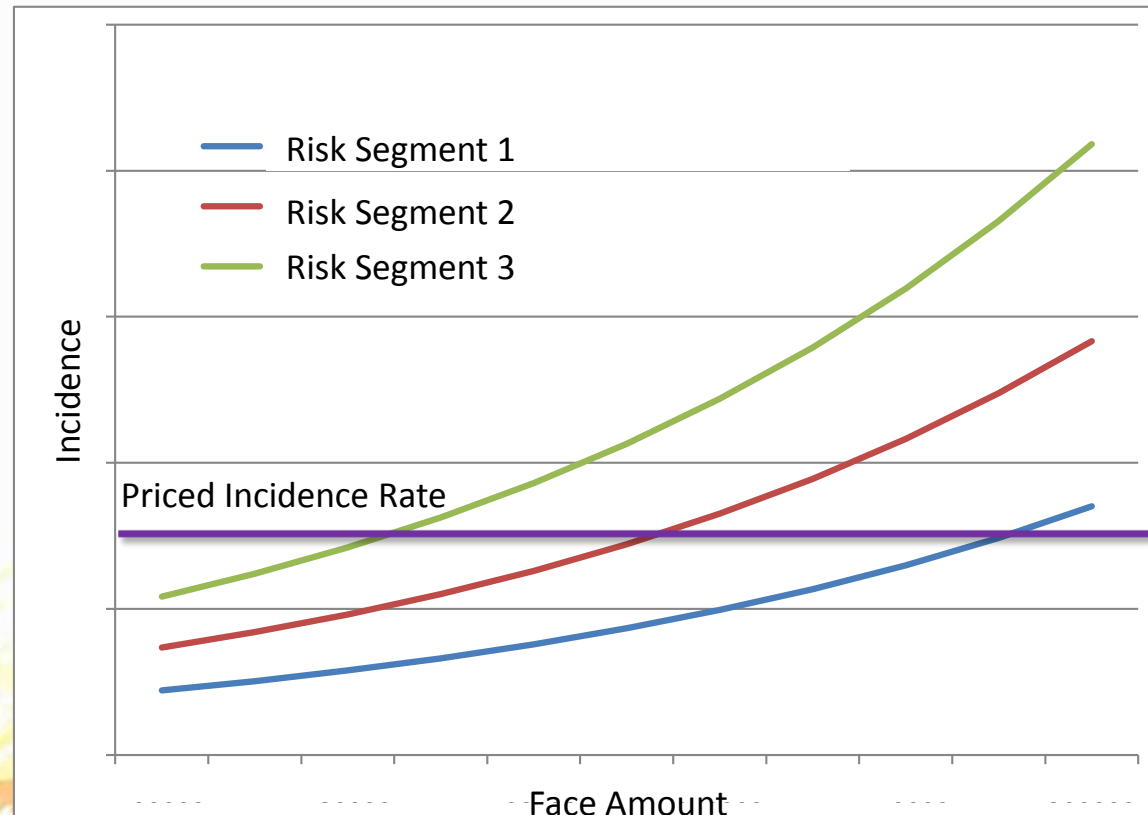
Agency Rating: The insurers current rating system works well with better experience business coming from higher rated agents.



Non-Med Limit Risk Segmentation Model

Setting Non-Medical Limits

Segment customers and set the non medical limit at or below the pricing assumption.



Typical Predictive Modelling Process



Time to Vote!

Is your company using predictive modeling, or are there plans for using it in the near future?

- A. Currently using it in some areas
- B. Not yet using it, but there are plans for using it in the near future
- C. Not yet using it and there are no plans
- D. I have no idea

Please vote at this link: <https://pollev.com/>

Time to Vote!

Which case study is the most interesting or relevant to your business?

- A. Banassurance Predictive Underwriting
- B. Multi-line Company Cross-sell Model
- C. NML Risk Segmentation Model

Please vote at this link: <https://pollev.com/>

Time to Vote!

Does your company have good data for predictive modeling?

- A. Absolutely
- B. Maybe
- C. Not at all
- D. I have no idea

Please vote at this link: <https://pollev.com/>

Time to Vote!

If you start using predictive modeling, what is potentially the biggest hurdle?

- A. Not enough data
- B. Data quality issues
- C. Lack of expertise in data analytics
- D. Resourcing and prioritization of projects

Please vote at this link: <https://pollev.com/>

Closing Thoughts

Where do I begin...

- Understand the business needs
- Understand the competition

We don't have data...

- You are not alone
- Or perhaps you do have data

We don't have the expertise and risk appetite...

- Identify the existing resources
- Seek external resources

Big projects are risky...

- Start with a pilot and learn from it

We don't have the budget...

- Build the business case



Time to get moving!

Thank you!