



**2019 HEALTH**  
MEETING

JUNE 24-26 | PHOENIX, AZ



## **Session 40, AI for Health Actuaries**

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# Artificial Intelligence for Health Actuaries

Moderator: Sarah Abigail

Presenters: Martin Snow, FSA, MAAA

Yiding Jiang

Gaurav Gupta

June 24, 2019

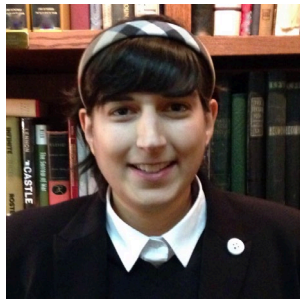




# #AIforActuaries



# Artificial Intelligence for Health Actuaries



**Sarah Abigail**

Co-Founder, Ironbound Consulting Group  
[@ironbcg](#)



**Yiding Jiang**

Health Actuary, Health Reveal  
[@HealthReveal](#)



**Martin Snow, FSA, MAAA**

VP & CDO, Atidot  
[@AtidotIsrael](#)



**Gaurav Gupta**

Co-Founder & CEO, QuaEra Insights  
[@QuaEraInsights](#)

# Predictive Analytics and AI For Health Insurance

Health Meeting  
June 24, 2019

Martin Snow, FSA, MAAA





# Predictive Analytics and AI

## Health Insurance

- How data transformed the Entertainment and Mass Media industries
- Why is this relevant to the Insurance industry?
- What should an Actuary do?
- Use cases



# Netflix vs. Blockbuster





# Why Did Blockbuster Fail?

- Strengths
  - Well-disciplined operation
  - Tight organization with efficient execution
- Weaknesses
  - Did not easily incorporate new information
  - Failed at change management
  - Did not use data effectively



# What Netflix Did Right

- Saw how technology would change movie rental delivery
- Understood data and used it effectively
- Operated online – avoid the burden of retail outlets
- Improved service and pricing
- Set a new standard for the exploding movie / video market



# How Does This Apply to Insurance?

- How responsive is the insurance sales model?
- How engaging is the insurance customer relationship model?
- How successful are we at claims management?
- How will more precise assumptions with lower variability improve your bottom line? Risk management?
- Insurers have more data on their customers than Facebook does.



# What Should an Actuary Do?

- Be educated (and can also be data scientist)
- Be a change agent
- How is your business represented in the model?
- Is the model producing reasonable and usable results?
- Are the algorithms correct?
- Have the results been validated?
- Is the data being used legal and ethical?
- How can predictive analytics be used in your domain?



## Use Cases

- 2016 University of Texas Study:
  - Nearly 1 in 5 hospitalized adults is discharged with one or more vital sign instabilities
  - Patients with vital sign abnormalities on day of discharge had higher rates of hospital readmission and death within 30 days
  - ‘Vital signs are still vital’
  - At a minimum, patients with one instability on discharge should be discharged with caution.





## Use Cases

- 2017 University of Pennsylvania Study:
  - Mortality rates from sepsis can reach 30 percent, and the condition accounts for close to \$24 billion in spending each year
  - Nearly half of all hospital deaths are caused by sepsis.
  - Identified patients headed for severe sepsis or shock 12 hours before onset
  - Used EHR data from 160,000+ patients and a random forest
  - Providers receive alerts when patients screen positive for sepsis





# Use Cases

- P&C Pricing / Health Insurance Risk Adjustment
- Underwriting
- Claims Utilization and Management
- Fraud Detection and Prevention
- Agent Selection
- Marketing / Customer Engagement / Upselling / Cross-selling
- Retention / Risk Management / Valuation



# Claims Management

- Workers' Comp, Auto, Health, LTC, LTD, Ancillary Life Benefits, Other
  - What is the appropriate level of Claims Reserve?
  - How can potentially large claims be identified early?
  - Which claims may be fraudulent?





# What Predictive Modeling Does

- Compare factors associated with new claims against experience
  - Type of injury
  - Treatment plan
  - Insured data
  - Characteristics of the claimant
  - Attorneys
  - Jurisdiction





# Who Will Make an LTC Claim?

- Enables improved risk management
- Enables better claims management
- Advanced education techniques
- Data includes quantity, quality and type of local LTC facilities

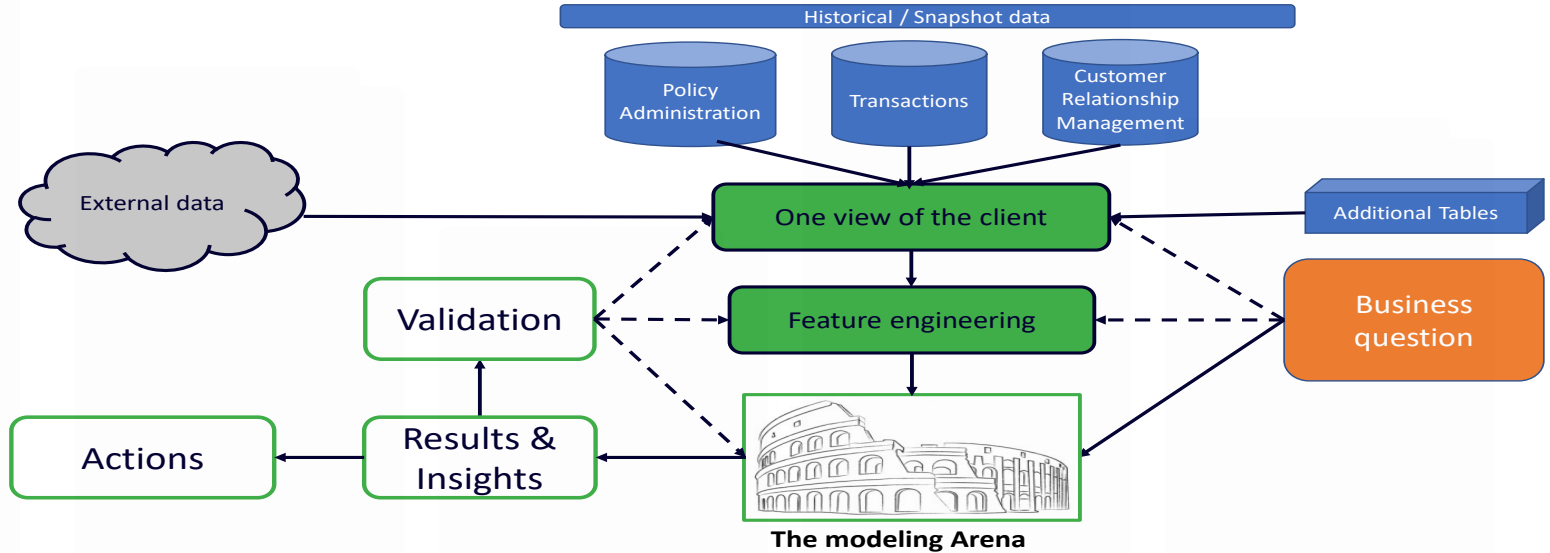


# Product Development & Pricing

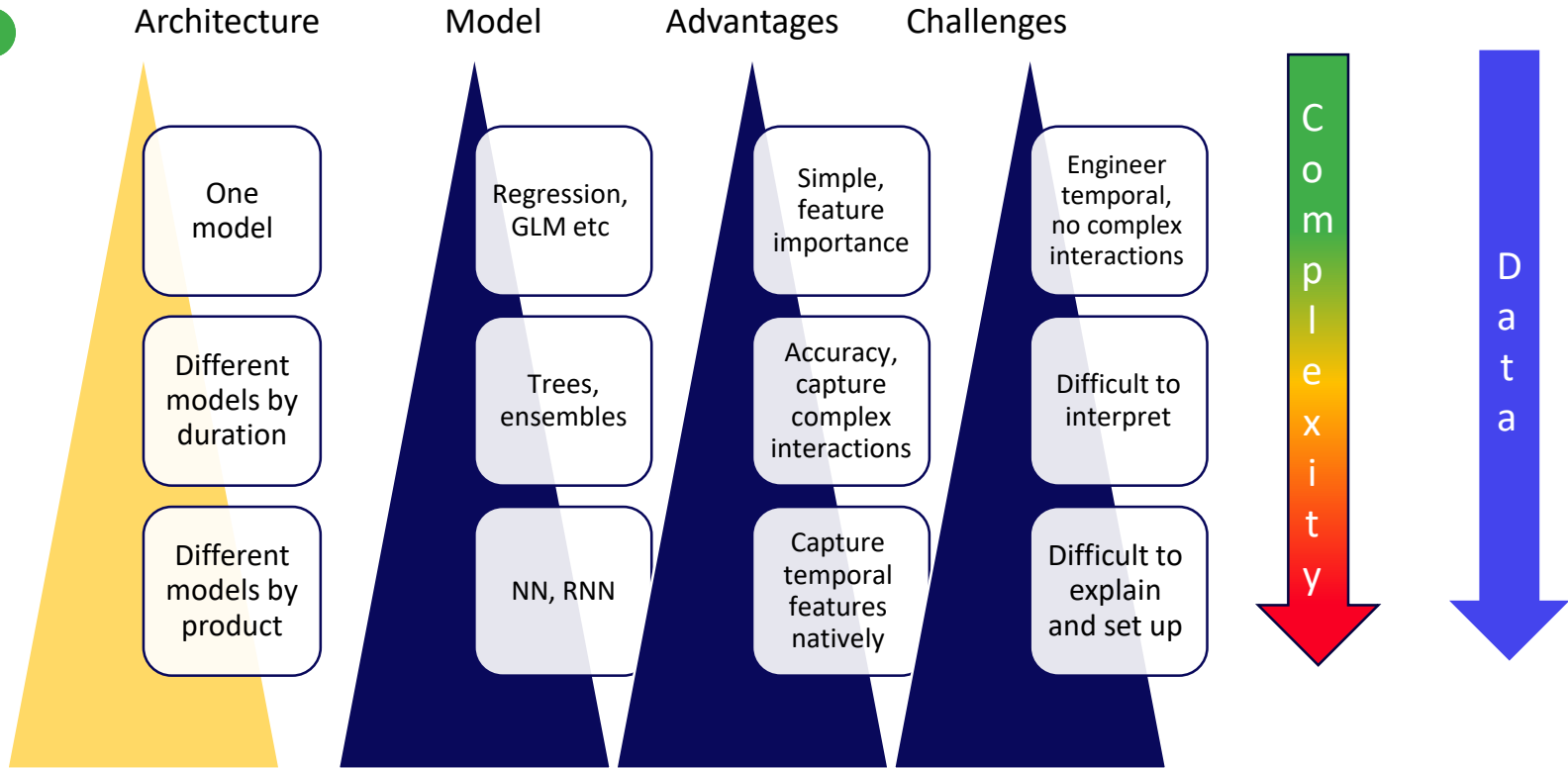
- You now know how policyholders respond to each feature and each price
- You can identify how changes in price and product features influence customer behavior and impact risk.
- Use this information to design better – and lower risk – products that are more optimally priced.
- Do the same with your communication campaigns!



# Predictive Analytics Data Flow



# Modelling landscape





# Conclusion

- Predictive Analytics, Artificial Intelligence, and Machine Learning will create a massive revolution in the insurance industry.
- The determinant of future success for established insurers will be how well they embrace the new technology
- Core changes are required for insurers to succeed and reap the major strategic benefits that will accrue to early adapters.
- How are you going to change the thinking at your company?



# Thank You

Martin Snow, FSA, MAAA

Vice-President & Chief Delivery Officer

Atidot

Martin@Atidot.com

**Atidot**  
Makes Insurance Smarter

