

BIG DATA AND THE ROLE OF THE ACTUARY

PRESENTATION TO NAIC CASTF PREDICTIVE ANALYTICS BOOK CLUB

JUNE 26, 2018



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American Academy of Actuaries
Big Data Task Force, *Chairperson*

Exponential Growth



ARTIFICIAL INTELLIGENCE



FUTURISTIC WEARABLE TECH
COULD THESE 20-PI OBJECTS IMPROVE YOUR HEALTH?

ROAD WARRIOR

Personal Coaching Device
Get real-time, personalized coaching and motivation on your smartphone.

Smart Watch
This is the age of smart watches. You'll be able to track your health, monitor your stress levels, and even receive medical alerts.

Smart Glasses
Get real-time, personalized coaching and motivation on your smartphone.

FITNESS JUNKY

Digital Running
Track your runs, monitor your heart rate, and even receive personalized coaching on your smartphone.

Smart Bike Mount
Get real-time, personalized coaching and motivation on your smartphone.

Smart Shoes
Track your steps, monitor your heart rate, and even receive personalized coaching on your smartphone.

TECHNO-CHIC

Smart Contact Lens
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Table of Contents

- ▣ Current and Emerging Practices
- ▣ Regulatory Issues
- ▣ Professionalism
- ▣ Appendices
 - InsurTech
 - Actuarial Standards of Practice



Current and Emerging Practices



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What is Big Data?

- No widely accepted definition
- 5 Vs:
 - ▣ Variety
 - ▣ Value
 - ▣ Veracity
 - ▣ Volume
 - ▣ Velocity
- Predictive Analytics
- Computational Algorithms
- Data Handling





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Applications

- Telematics
- Internet of things
- Machine learning
- Cognitive computing
- Artificial intelligence



The American Academy of Actuaries' Role

Public Policy and Professionalism



Data Analytics Techniques and Methodologies

- Descriptive – What happened?
- Diagnostic – Why did it happen?
- Predictive – What will happen?
- Prescriptive – What should I do?



Application of Predictive Analytics

- ❑ Marketing
- ❑ Engagement
- ❑ Underwriting
- ❑ Product Development
- ❑ Claims and Reserving
- ❑ Decision-Making Analytics
- ❑ Behavior Analytics
- ❑ Customer Satisfaction and Upselling
- ❑ Targeted Marketing



Practice Area Specific Applications

- Life
- Property & Casualty
- Health
- Pensions



Considerations in the Use of Predictive Analytics

- Business Considerations
- Model Development Considerations



Data Sources

- Traditional
- Emerging
- Practice Areas
 - ▣ Life
 - ▣ Property & Casualty
 - ▣ Health
 - ▣ Pensions



Regulatory Considerations



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Benefits and Challenges

- Insurers
- Consumers
- Regulators



Insurance Industry

- Confidentiality of intellectual property submitted to regulators
- Standards that are barriers to conducting business
- Specific lines of business requirements



Consumers

- Adequate privacy standards
- Data ownership rights
- Notification by insurers of use of consumer data
- Contest and correct data



Regulators

- ❑ Satisfactory and appropriate access to insurers' models
- ❑ Prohibited data variables
- ❑ Specific levels of correlation/causality for rating variables
- ❑ Additional risk segmentation (good or bad?)
- ❑ Oversight of data vendors
- ❑ Specific standards for certain lines of business



Existing Regulatory Framework

- Consumer Protection
- Anti-Discrimination



Emerging Regulatory Developments

- NAIC Big Data (EX) Working Group/CASTF
- Permitted Uses
- Data Ownership, Transparency, Portability
- Regulatory Sandboxes
- Regulatory Disruptors





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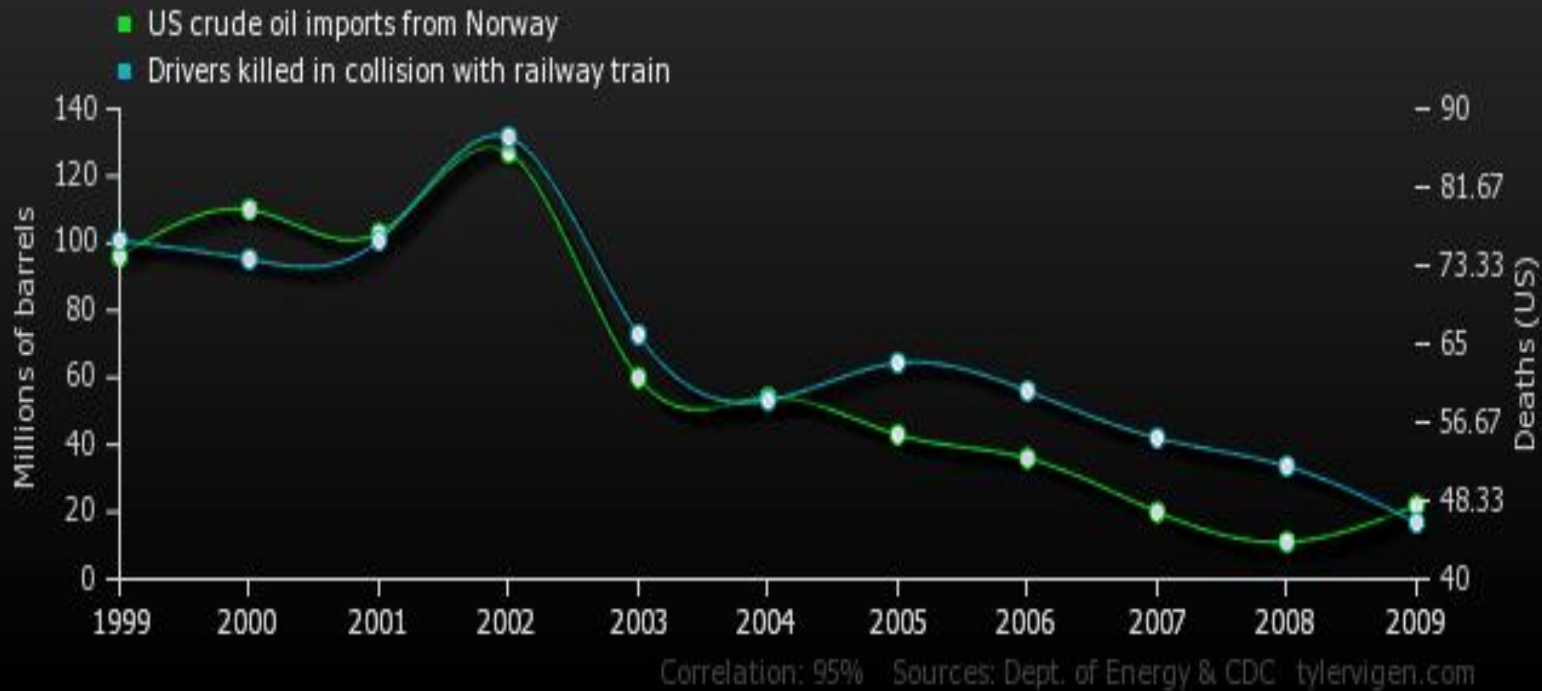
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Regulatory Challenges

- Privacy
- Staffing
- Correlation vs. Causation





Spurious Correlation



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Work with your regulators



Actuarial Professionalism



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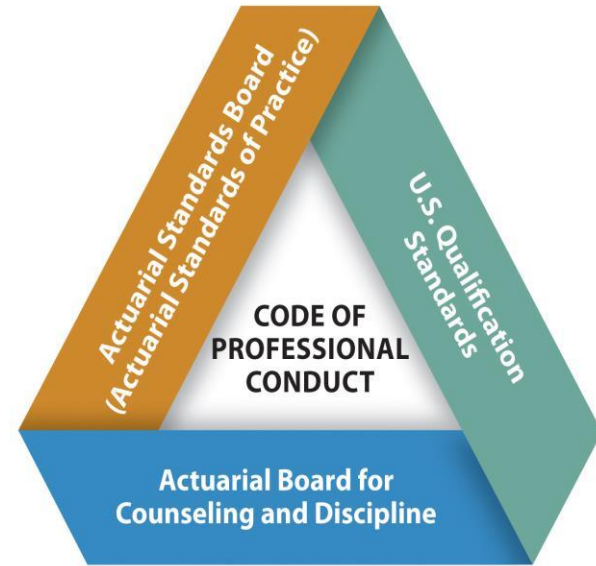
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The Web of Professionalism

The Basis of Self-Regulation of the US Actuarial Profession

- ▣ The Code of Professional Conduct
- ▣ U.S. Qualification Standards (USQS)
- ▣ Actuarial standards of practice (ASOPs)
- ▣ Counseling and discipline



Actuarial Standards of Practice

- Data Quality
- Risk Classification
- Using Models Outside the Actuary's Expertise (P&C)
- Credibility Procedures
- Actuarial Communications
- Responding to or Assisting Auditors or Examiners



Role of Professional Judgment

- Questions to consider
 - 1) How representative is your data set?
 - 2) Does your model account for biases?
 - 3) How accurate are your predictions based on Big Data?
 - 4) Does your reliance on Big Data raise fairness or ethical concerns?
 - 5) Unfair Discrimination?

Source: *Big Data: A Tool for Inclusion or Exclusion*, FTC, January 2016



Understanding Some Ethical Guidelines

□ Questions to consider

- 1) Does your approach comply with applicable law – both letter of the law and in spirit?
- 2) Are certain permissions needed?
- 3) Are you comfortable describing to your stakeholders what you are doing (consumers, insurance companies, providers, regulators, auditors, etc.)?



Professional Judgment

- The Role of Professional Judgment
 - Value of being able to connect the dots
 - Big Data can be misleading
 - Context
 - Overreliance
 - Cherry-picking
 - Correlation is not causality
 - Beware of spurious correlations & statistical paradoxes



Role of the Actuary

- Multidisciplinary Team
- Statistician, Computer Expert, Data Scientist, Actuary
- Subject Matter Expert
- Hypothesis Generator
- Turn Big Data into Smart Data



Clear Communications



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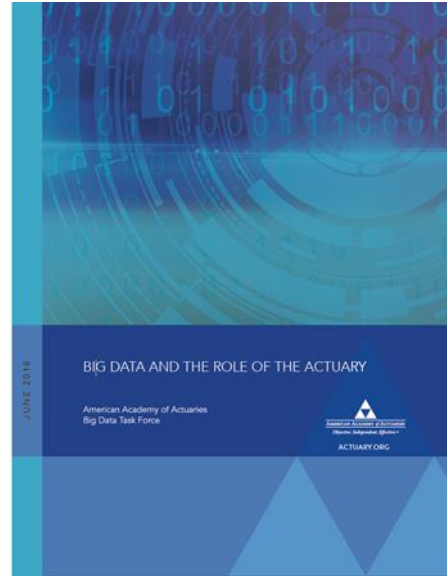
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Big Data and the Role of the Actuary

Monograph, June 2018



Questions / Comments



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