AROCHA & ASSOCIATES

# A Day in the Life of an AI-Assisted Actuarial Team

## A Practical, Real-Life Session on Leading a Small Team

NIST AI CONSORTIUM

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# Antitrust Compliance Guidelines

Active participation in the Society of Actuaries is an important aspect of membership. While the positive contributions of professional societies and associations are well-recognized and encouraged, association activities are vulnerable to close antitrust scrutiny. By their very nature, associations bring together industry competitors and other market participants.

The United States antitrust laws aim to protect consumers by preserving the free economy and prohibiting anti-competitive business practices; they promote competition. There are both state and federal antitrust laws, although state antitrust laws closely follow federal law. The Sherman Act, is the primary U.S. antitrust law pertaining to association activities. The Sherman Act prohibits every contract, combination or conspiracy that places an unreasonable restraint on trade. There are, however, some activities that are illegal under all circumstances, such as price fixing, market allocation and collusive bidding.

There is no safe harbor under the antitrust law for professional association activities. Therefore, association meeting participants should refrain from discussing any activity that could potentially be construed as having an anti-competitive effect. Discussions relating to product or service pricing, market allocations, membership restrictions, product standardization or other conditions on trade could arguably be perceived as a restraint on trade and may expose the SOA and its members to antitrust enforcement procedures.

While participating in all SOA in person meetings, webinars, teleconferences or side discussions, you should avoid discussing competitively sensitive information with competitors and follow these guidelines:

- **Do not** discuss prices for services or products or anything else that might affect prices
- **Do not** discuss what you or other entities plan to do in a particular geographic or product markets or with particular customers.
- **Do not** speak on behalf of the SOA or any of its committees unless specifically authorized to do so.
- **Do** leave a meeting where any anticompetitive pricing or market allocation discussion occurs.
- **Do** alert SOA staff and/or legal counsel to any concerning discussions
- **Do** consult with legal counsel before raising any matter or making a statement that may involve competitively sensitive information.

Adherence to these guidelines involves not only avoidance of antitrust violations, but avoidance of behavior which might be so construed. These guidelines only provide an overview of prohibited activities. SOA legal counsel reviews meeting agenda and materials as deemed appropriate and any discussion that departs from the formal agenda should be scrutinized carefully. Antitrust compliance is everyone's responsibility; however, please seek legal counsel if you have any questions or concerns.

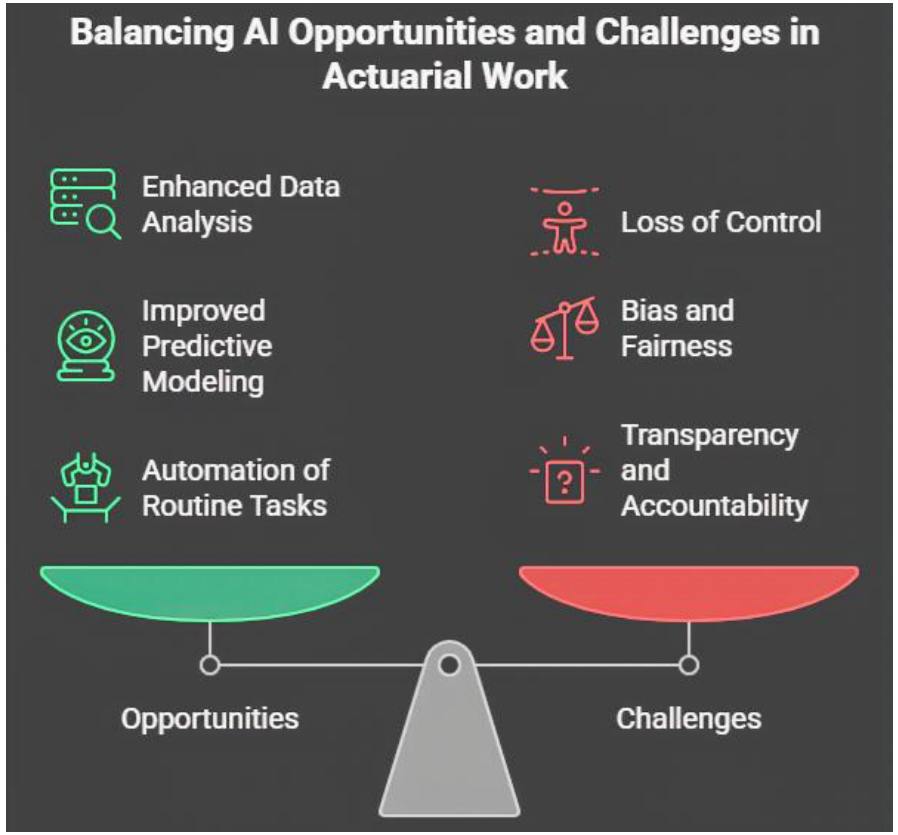
# Presentation Disclaimer

**Presentations are intended for educational purposes only and do not replace independent professional judgment.**

Statements of fact and opinions expressed are those of the participants individually and, unless expressly stated to the contrary, are not the opinion or position of the Society of Actuaries, its cosponsors or its committees. The Society of Actuaries does not endorse or approve, and assumes no responsibility for, the content, accuracy or completeness of the information presented. Attendees should note that the sessions are audio-recorded and may be published in various media, including print, audio and video formats without further notice.

# 8:30 AM—The Real Situation

You manage a team of three actuaries. The team is tasked to building a pricing model. Activities include developing a GLM, testing a Neural Network, automating Python, and creating stakeholder slides.




- ✓ **Enhanced Data Analysis**: AI process vast amounts of data more quickly and accurately
- ✓ **Improved Predictive Modeling**: ML algorithms can identify complex patterns in data, leading to more accurate risk assessments
- ✓ **Automation of Routine Tasks**: Actuaries can focus on higher-level analysis
- ✗ **Loss of Control**: There is a risk that actuaries may lose control over critical processes
- ✗ **Bias and Fairness**: algorithms can perpetuate biases in training data
- ✗ **Transparency and Accountability**: The "black box" nature make it difficult for actuaries to understand how decisions are made

Ask not
Should we allow AI?

... but
How do we use AI without losing control of the actuarial work?

# GLMs & FFNNs

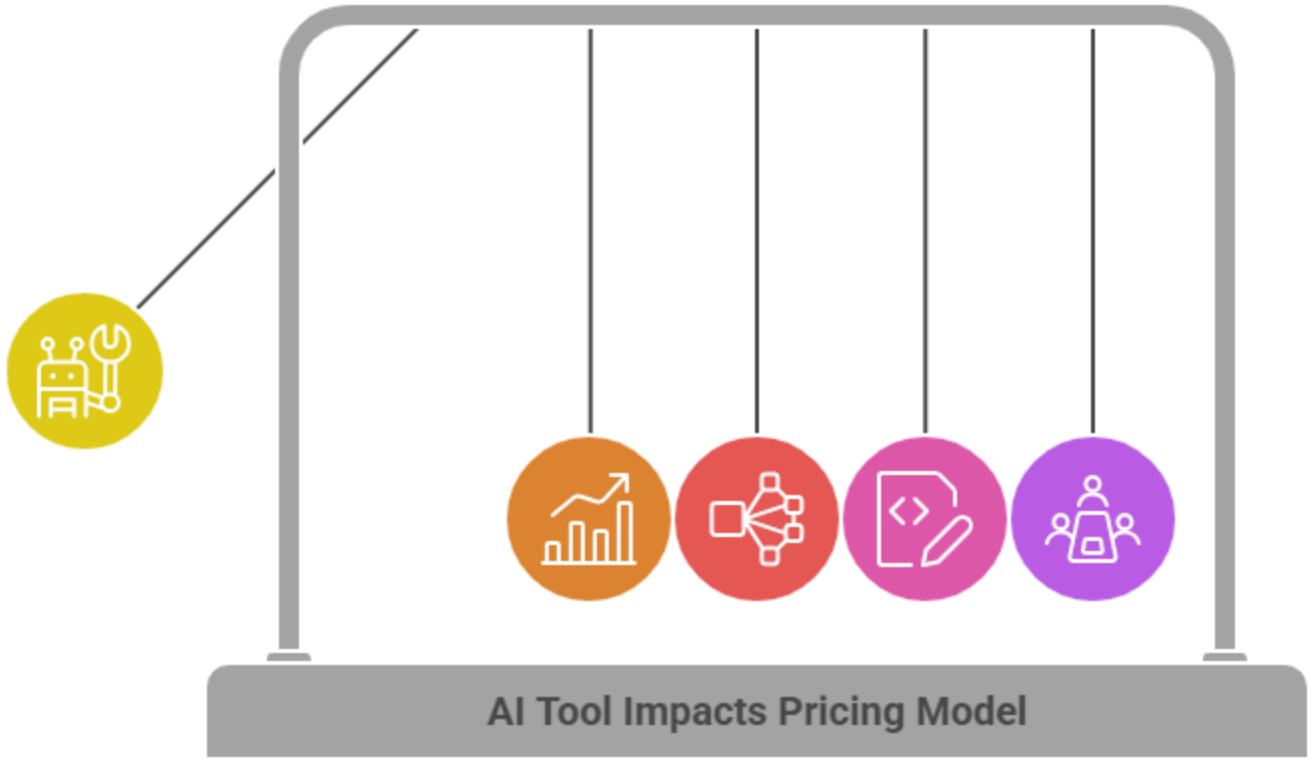


- A **Generalized Linear Model (GLM)** is a statistical model widely used in insurance pricing to estimate outcomes (e.g., claim frequency, severity, or pure premium) based on risk factors
- It produces results that are easy to explain, validate, and defend to stakeholders.



- A **Feedforward Neural Network (FFNN)** is a machine learning model that can detect complex patterns and interactions in the data that a GLM may miss
- Its advantage is potentially better predictive performance, but it usually requires stronger validation, explainability, and governance controls before being used for business decisions

# 9:00 AM—The Case Study: A Pricing Model Refresh



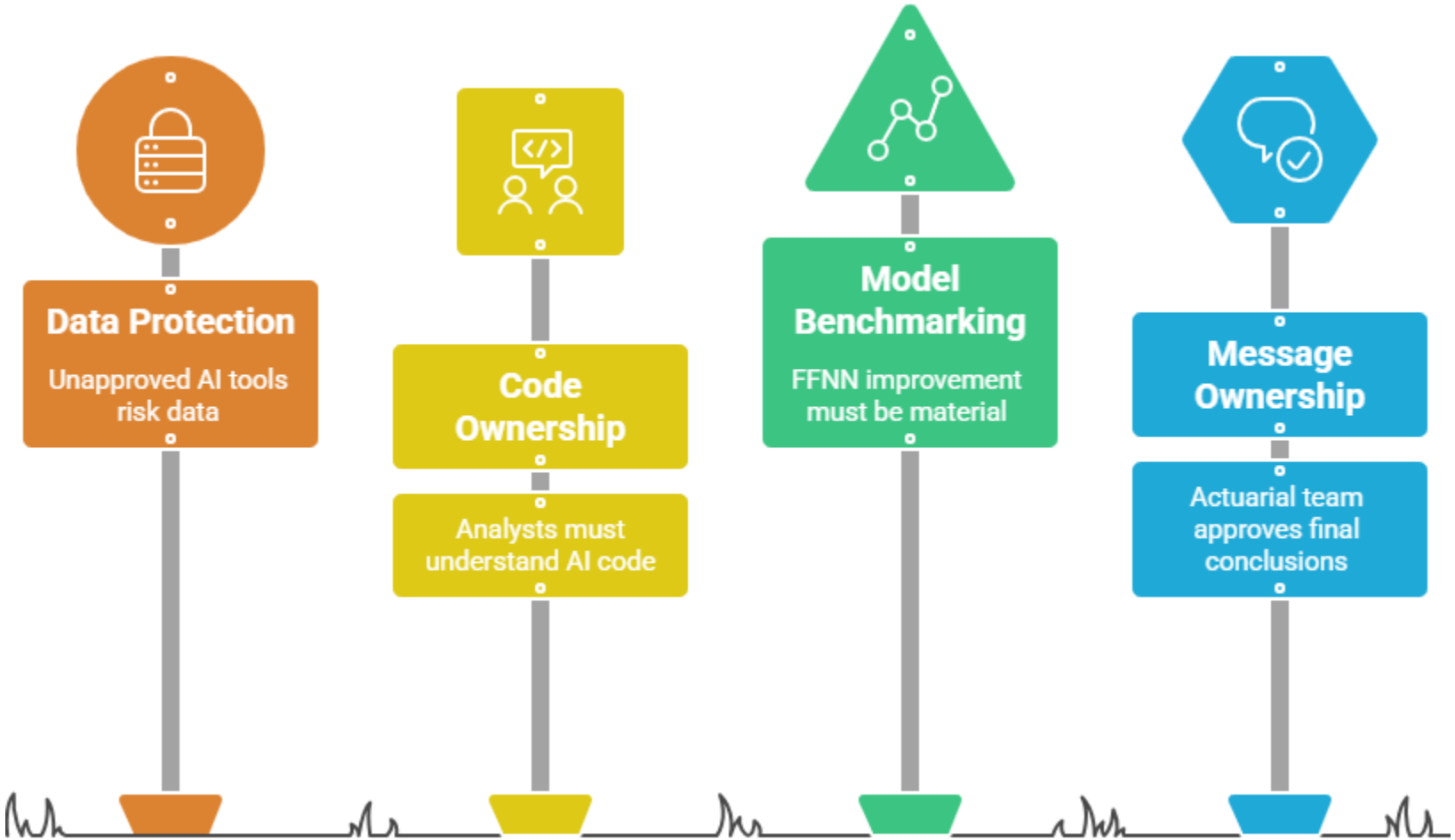

The same AI tool can be low-risk or high-risk depending on where it enters the workflow

| AI Tool | Baseline Model | Challenger Model | Python Scripts | Management Presentation |
|---|---|---|---|---|
| Assists in pricing model | Builds a GLM baseline | Tests a FFNN model | Cleans, engineers, fits, validates | Recommends pricing actions |

# 11:30 AM—The Team's Practical AI Rulebook

AI can assist the team, but it cannot be the actuary of record

1. Protect the data
2. Own the code
3. Benchmark the model
4. Own the message



# Where AI is Allowed

AI as assistant is allowed, but AI as decision-maker is NOT allowed

- Python syntax help
- Drafting comments and documentation
- Generating unit-test ideas
- Explaining model diagnostics
- Suggesting validation checks
- Improving slide wording
- Summarizing non-confidential methodology
- Creating first drafts of management messages

Each output must be carefully reviewed before use

# 2:00 PM—GLMs vs FFNNs: The Governance Decision

The team needs to compare two models:

- The GLM is transparent, stable, and easy to explain
- The FFNN is expected to perform slightly better on *some metrics* but it is harder to explain. It requires additional validation, calibration, sensitivity testing, feature importance, SHAP (or similar explainability), and comparison against the GLM

### Governance Test

- ☑ Can we explain it?
- ☑ Can we reproduce it?
- ☑ Can we validate it?
- ☑ Can we defend it to management?
- ☑ Can we monitor it after implementation?

★ In a small team, the GLM is the governance benchmark

# 3:00 PM—The Audit Trail

| | |
|---|---|
| **Who used AI** | Person employing the AI |
| **Which tool was used** | Specific AI software or platform |
| **What it was used for** | Purpose of the AI application |
| **Confidential data involved** | Whether sensitive information was used |
| **Output status** | Accepted, modified, or rejected |
| **Who reviewed the result** | Individual or team assessing the output |
| **Final decision** | Outcome of the review process |

For this project, the team will keep a simple evidence trail.

This does not need to be bureaucratic—a simple spreadsheet can be enough.

★ If AI helped, we need evidence to reconstruct the decision

# 4:30 PM—Before Presenting to Management

The management presentation is a **controlled** actuarial communication.

## Ex-post questions for the team

- ☑ Have we reviewed all AI-assisted code?
- ☑ Can another team member reproduce the results?
- ☑ Have GLM and FFNN results been compared fairly?
- ☑ Do we understand the key model drivers?
- ☑ Are the results stable by segment and time period?
- ☑ Have we documented limitations?
- ☑ Are the recommendations written in our own voice?

## My ideal statement

*"AI tools were used to support coding, documentation, and exploratory diagnostics. Final model selection, validation, assumptIons, and pricing recommendations remain the responsibility of the actuarial team."*

# Takeaways

- Use AI **freely** when it helps productivity
- Use it **carefully** where it affects judgment
- Use it **formally** where it affects decisions

# Questions?

