MEMORANDUM

To: Superintendent Elizabeth Kelleher Dwyer,
         Chair of the Big Data and Artificial Intelligence (H) Working Group

From: Commissioner Kevin Gaffney, Chair of Workstream One (Surveys) of the Big Data and Artificial
         Intelligence (H) Working Group

Cc: Fourteen-State Subject Matter Expert Group; Kris DeFrain (NAIC)

Date: November 30, 2023

Re: 2023 Life Artificial Intelligence (AI)/Machine Learning (ML) Survey Analysis

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The 2023 Life Artificial Intelligence/Machine Learning Survey (Life AI/ML Survey) was conducted to inform the work of the Big Data and Artificial Intelligence (H) Working Group in support of its charge to:

> *Research the use of big data and artificial intelligence (AI) in the business of insurance, and evaluate existing regulatory frameworks for overseeing and monitoring their use. Present findings and recommended next steps, if any, to the Innovation and Technology (EX) Task Force, which may include model governance for the use of big data and AI for the insurance industry.*

The survey was conducted under the market examination authorities of 14 requesting states (Colorado, Connecticut, Illinois, Iowa, Louisiana, Minnesota, Nebraska, North Dakota, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, and Wisconsin) and completed by insurers who actively write Life insurance in at least one of the participating states and 1) have at least $250 million in national life insurance premium for 2021, 2) covered at least 10,000 lives by issuing term insurance in 2021, or 3) is an identified InsurTech company. Note this survey is limited to the application of AI/ML in life insurance products only, excluding annuities. The following subject matter experts (SMEs) represented the fourteen states:

CO: Jason Lapham
CT: Paul Lombardo
IL: Erica Weyhenmeyer
IA: Jared Kirby
LA: Nichole Torblaa
MN: Fred Andersen
NE: Director Eric Dunning
ND: Ross Hartley
OR: Brian Fjeldheim
PA: Shannen Logue
RI: Matt Gendron

VT: Commissioner Kevin Gaffney
VA: Eric Lowe
WI: Lauren Van Buren

This memorandum contains the SMEs' summary of the survey analysis, key takeaways, and some recommendations for next steps. The SMEs also approved public distribution of the attached NAIC staff's survey analysis, which provides more detail about the survey results.

SURVEY ANALYSIS SUMMARY

Artificial Intelligence/Machine Learning Model Use by Companies

In contrast to the Private Passenger Auto and Home AI/ML Surveys, this survey intentionally includes Generalized Linear Models (GLMs) and Generalized Additive Models (GAMs) as types of AI models in scope, so the data should be interpreted as applying to insurers' predictive models including these model types. Out of 161 companies[1] completing the survey, 94 companies currently use, plan to use, or plan to explore using AI/machine learning (ML) as defined for this survey. This equates to 58% of reporting companies. For comparison, 88% of the companies responding to the PPA Survey and 70% of the companies responding to the Home Survey reported they currently use, plan to use, or plan to explore using AI/ML (where AI/ML algorithms were defined as *excluding* GLMs and GAMs).

Among the total number of AI/ML models that have been implemented by life insurers responding to this survey, 36% were used for Marketing and 34% were used in Underwriting, while only 18% were used for Pricing and 11% were used for Risk Management.

Of the 67 companies that indicated they had no plans to use or explore the use of AI/ML, the most common reason stated by 48 companies (72%) was "no compelling business reason." The second and third most common reasons stated by 31 companies (46%) each, reported "lack of resources and expertise," and "reliance on legacy systems requiring IT, data, and technology upgrades." Note that these responses are not mutually exclusive as multiple reasons may be applicable.

The following highlights the predominant uses, the levels of decision-making, and how often models are developed in-house or externally by insurer operation.

MODELS BY INSURER OPERATION

Marketing

Uses: For marketing life insurance products, companies reported currently using AI/ML models mostly for target online advertising (24 companies), followed by provisions of offers to existing customers (21 companies), identification of recipients of mail or phone advertising (19 companies), and identification of potential customer groups (18 companies). Other uses include other marketing-related functions (11 companies), demand modeling (9 companies), and direct online sales (7 companies).

Level of decision-making: A majority of the total AI/ML models reported for Marketing *augmented* human decision-making, however approximately 40% of the AI/ML models used for target online advertising were *automated*, and 60% of the models used for other marketing-related functions were used to *support* human decision-making.

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[1] A total of 179 companies were selected to participate in the survey. Of those, 2 companies submitted incomplete surveys and 16 companies were exempt.

In-house or third-party: While a slight majority (56%) of the models reported for Marketing in total were developed by a third party, 76% of the models used for identification of recipients of mail or phone advertising, and 75% of the models used for provisions of offers to existing customers were developed internally.

Types of models: A wide variety of model types used for Marketing purposes were reported. The two most popular techniques were regression/regularization-based methods (which likely refer to GLMs), and ensemble methods (which combine several, usually machine learning, modeling types to achieve better performance).

Pricing and Underwriting

Uses: In pricing and underwriting, companies reported currently using AI/ML models mostly to reduce time to issue (35 companies), but 29 companies each also reported using models for automated approval/denial decisions and assigning a risk class through underwriting, and 25 companies reported using models for non-automated approval/denial decisions.

Level of decision-making: Almost half (48%) of the AI/ML models in total reported for Pricing and Underwriting uses were *automated.*

In-house or third-party: Models used for Pricing and Underwriting were almost evenly split between developed internally (46%) and by third parties (54%). However, over two thirds of the models (68%) used for non-automated approval/denials were developed by third parties. In contrast, over three quarters (77%) of the models developed for other underwriting-related functions were developed internally.

Types of models: A wide variety of model types used for Pricing and Underwriting were reported. As for Marketing, the two most popular techniques again were regression/regularization-based methods, likely referring to GLMs, and ensemble methods, which combine several, usually machine learning, modeling types to achieve better performance.

Risk Management

As noted above, 11% of the total AI/ML models in production were used for risk management. But because this information was provided by only 7 responding companies, it may be misleading to infer broad conclusions about how AI/ML models are currently being using within the life insurance market, the degree of human involvement in decision-making, the sources of model development, and the types of modeling algorithms used.

DATA ELEMENTS BY INSURER OPERATIONS

To gain a better understanding of the types of data used, insurers were asked whether they included any of the following in their AI/ML models: Credit-Based Insurance Score, Financial Credit Score, Other Types of Non-Credit "Score", Public Records, Demographics, Telematics Type Data, Driving Behavior, Biometrics, Medical, Online Media, and Other Non-Traditional Data Elements.

Among these specific elements:

- Marketing—Demographics data was used in nearly 40% of the AI/ML models by the responding companies, followed by Online Media data which was used in 17% of the models.
    - Demographics data was about equally split between internal and external sources, while Online Media data was nearly all externally sourced.

- Pricing and Underwriting—a wider variety of data elements were used: Medical data was used in 30% of the models, followed by Demographics data (17%), Driving Behavior data (15%), and Credit-Based Insurance Scores (14%).
  - Medical data, Driving Behavior data, and Credit-Based Insurance Scores were almost always externally sourced, while Demographics data was mainly internally sourced.
- Risk Management—Only 7 companies responded that they used any of these specific data elements in their AI/ML models for risk management. The variables that were indicated being used were: Credit-Based Insurance Score, Public Records, Demographics, Driving Behavior, Medical data, and Other Non-Traditional Data Elements.
  - Nearly all these data elements were externally-sourced.

CUSTOMER DATA CORRECTION

Non-Fair Credit Reporting Act (Non-FCRA) Data Disclosures to Consumers
Insurers were asked about their processes for informing consumers about data collection—when and how their data is used, *other than what is required by law* under the Fair Credit Reporting Act. By operational use, 37% reported "yes" for the data used for Marketing, 41% of companies reported "yes" for Pricing and Underwriting, and 23% reported "yes" for Risk Management.

Consumer Opportunity to Challenge or Correct Data
Insurers responded similarly to the question of whether consumers have an opportunity to correct their data that is not included under the FCRA: 34% reported "yes" for the data used for Marketing, 46% of companies reported "yes" for Pricing and Underwriting, and 26% reported "yes" for Risk Management.

GOVERNANCE

The purpose of the model governance questions is to obtain a better understanding of the company's awareness of specific risk areas tied to selected categories in the NAIC Artificial Intelligence Principles.

Insurers were asked if the following are *documented* in their governance program:

- Fairness and ethics considerations;
- Accountability for data algorithms' compliance with laws, as well as intended and unintended impacts;
- Appropriate resources and knowledge involved to ensure compliance with laws, including those related to unfair discrimination;
- Ensure transparency with appropriate disclosures, including notice to consumers specific to data being used and methods for appeal and recourse related to inaccurate data; and
- AI systems are secure, safe, and robust, including decision traceability and security and privacy risk protections.

The response rate to these governance questions was extremely low—only three companies provided responses. Of those, two companies answered "yes" that their governance program included the above considerations, while the third company responded "no" to this question.

However, when asked about components documented in Life Insurer Governance Programs, there was a nearly 60% response rate, which was fairly high. Of those responding, 53% reported their governance program includes documented Compliance with Laws and Regulations, 53% have Accountability for Intended or Unintended Impacts, 60% documented the Resources / Knowledge Needed to Ensure Compliance, 62% provide Transparency and Notices to Consumers About Their Data

and Methods for Correction, and 57% reported they document Assurance of Safe, Secure and Robust Systems Including Decision Traceability. 47% of the companies responded they follow guidance from other established standards, such as the Actuarial Standards Board, American Academy of Actuaries, Society of Actuaries, NIST, and others, including the Colorado Division of Insurance and the NAIC.

THIRD-PARTY DATA SOURCES AND MODELS

Insurers identified third-party vendors they use to purchase models and/or data. A very high proportion (94%) of insurers responded that contracts with third parties do not include any conditions that would limit disclosure or otherwise limit transparency to regulators.

Of the 365 total models listed in the survey, 165 (46%) models were developed internally, and 191 (54%) were developed by a third party. There were no models reported developed jointly with a third party. After grouping the similarly-named third parties, there were 59 unique third-party companies listed in the survey who provided the data elements noted in the above Data Elements section that were used in AI/ML models. Marketing has 37 different third parties listed as providing any of these data elements, and Pricing & Underwriting and Risk Management data were each sourced from 15 different third parties. Note that some third-party vendors provided data that were used in more than one insurer operation.

CONCLUSION/NEXT STEPS

The insights gained from the survey will be used to supplement state insurance regulators' knowledge of the current regulatory framework around AI/ML, governance, consumers, and third parties and to evaluate whether any changes should be made to the frameworks.

Following are some potential next steps, including many activities already in progress. This list is not intended to be complete, but it may be helpful as a starting point for discussions and decision-making about what next steps to take at the NAIC:

- Explore Insurer AI/ML model usage and the level of decision-making.
- Evaluate the regulatory framework about the use of third-party models.
- Determine whether additional white papers on best practices would be useful on subjects in the AI/ML space.
- Explore the use of AI/ML at the product level.

Additional information was collected but not documented due to the confidential nature. Regulators may contact Dorothy Andrews, dandrews@naic.org to seek additional, but non-company identifying information. This report is confidential because data was collected in a market conduct examination of the fourteen states and agreed confidentiality protections were applied.