

1. Consider Adoption of its March 11, Minutes

Attachment A

Commissioner Michael Humphreys (PA)



2. Receive an Update on the Artificial Intelligence (AI) / Machine Learning (ML) Surveys and Recommendations

Attachment B

Commissioner Michael Humphreys (PA)

Shannen Logue (PA)



Purpose of the Health AI/ML Survey

- Understand the current status of AI/ML use by comprehensive major medical and student health insurers
- Gain insight into the role third parties play in the development and use of AI
- Gain an understanding of health insurers' AI governance frameworks
- Review alignment of health insurers' AI governance frameworks with NAIC AI Principles and Model Bulletin

Participating States (16)

Colorado (CO), Connecticut (CT),
Illinois (IL), Iowa (IA), Louisiana (LA),
Maryland (MD), Minnesota (MN),
Nebraska (NE), North Dakota (ND),
Oklahoma (OK), Oregon (OR),
Pennsylvania (PA), Vermont (VT),
Virginia (VA), West Virginia (WV),
and Wisconsin (WI)

Health Carrier Selection Criteria

Selected health insurance companies were subject to the following criteria:

- Written business in one or more of the participating 16 states
- Countrywide 2023 earned premiums of at least \$250,000,000
- Or
- Significant market share in one or more of the participating states

Product Lines Surveyed

Major Medical Plans

- Individual Comprehensive
- Small Group Comprehensive
- Large Group Comprehensive

Other Plans

- Student Health Plans

Functional Areas Surveyed

- Product Pricing and Plan Design
- Claims Adjudication
- Prior Authorization
- Utilization/Severity/Quality Management
- Fraud Detection
- Risk Management
- Risk Adjustment
- Data Processing
- Strategic Operations

AI/ML Adoption Status

- Does your company use AI/ML as defined in this survey? (78)
- Does your company plan to use AI/ML as defined in this survey? (3)
- Is your company currently exploring the use of AI/ML as defined in this survey? (5)
- No adoption of AI/ML (7)

AI Adoption Among the Four Lines of Insurance

Health Insurers

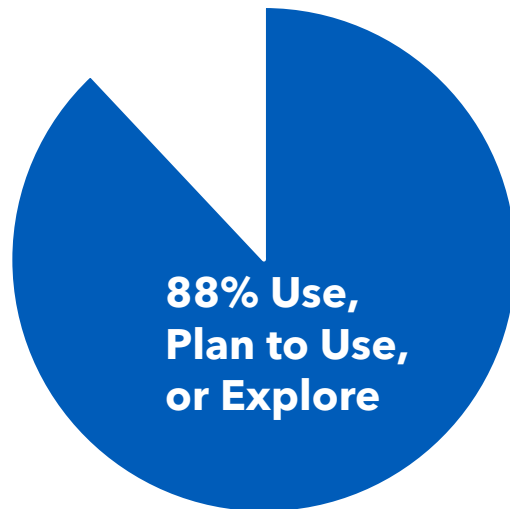
March 2025



93 Health Insurers Responded

Auto Insurers

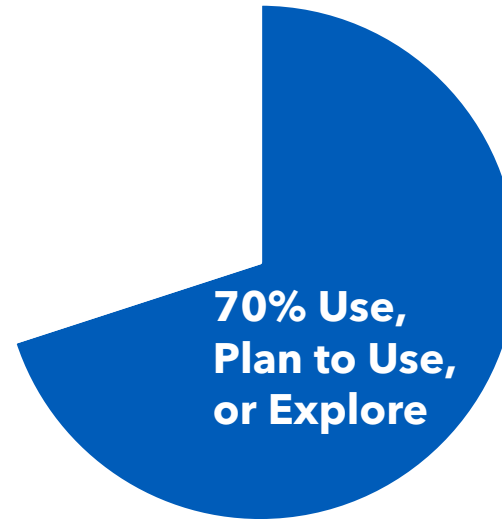
December 2022



193 Auto Insurers Responded

Home Insurers

August 2023



194 Home Insurers Responded

Life Insurers

December 2023



193 Life Insurers Responded

Nonuse of AI

Survey Question: Which reason best describes why you are not using Artificial Intelligence as described in this survey?

Responses

No compelling business reason at this time

Waiting for regulatory guidance

Lack of resources and expertise, reliable data

Legacy systems requiring data & technology upgrades

Waiting on third-party vendor product/service availability

Risk is not commensurate with current strategy or appetite

Reason other than the above

Implementation by Operational Area

Operational Area	In Production	0-1 Year	1-3 Years	3+ Years
Strategic Operations	79%	8	6	0
Utilization/Severity/Quality Mgmt	70%	10	6	2
Fraud Detection	70%	10	6	2
Sales & Marketing	70%	12	4	0
Claims Adjudication	62%	10	7	2
Data Processing	60%	9	12	2
Risk Adjustment	50%	10	17	2
Risk Management	41%	16	13	1
Product Pricing and Plan Design	37%	15	16	6
Prior Authorization	29%	16	25	3

Top 3 Machine Learning Techniques

Individual Major Medical

1. Ensemble
2. Large Language Model
3. Decision Trees

Student Health

1. Ensemble
2. Clustering
3. Rule System

Small Group Major Medical

1. Ensemble
2. Decision Trees, Dimensionality Reduction, Clustering
3. Large Language Models

Large Group Major Medical

1. Ensemble
2. Large Language Models, Decision Trees
3. Deep Learning

Third-Party Data Usage

Do you develop Artificial Intelligence (AI)/Machine Learning (ML) systems internally, use vendors, or both internally with input from vendors?

	Count	Percent %
N/A	5	6%
Develop Internally	8	10%
Develop by a Third-Party	12	15%
Develop Internally with a Third-Party	10	13%
Develop Internally with Third-Party Components	43	55%
Total	78	100%

AI/ML Model Testing

Survey Question	Yes
Does your company...	
▪ Document accuracy of AI/ML model outcomes?	82%
▪ Document reliability of AI/ML model outcomes?	80%
▪ Test for model drift?	76%
▪ Test for bias in algorithmic outcomes?	75%
▪ Test for bias in modeling data?	70%
▪ Conduct audits on its AI/ML models?	70%
▪ Document unfair discrimination on its AI/ML models?	63%
▪ Apply statistical methods to infer protected class characteristics?	38%

Governance

Disclosures Survey Questions	Yes
Do you have AI/ML Governance Principles in place that model the NAIC AI Principles?	92%
Do you have a process for applicants for health insurance to contest an adverse underwriting decision?	29%
Do you keep a log of the number of contested underwriting decisions?	23%
Do you disclose to providers, or physicians how and when AI/ML is used by the insurer or a third-party vendor?	23%

Complete Automation–Human Aided AI/ML	Yes
Extent of AI Automated Decision Making < 50%	98%
Extent of AI Augmentation Decision Making < 50%	85%
Extent of AI Supporting Decision Making < 50%	70%

Health Report
Publication Tentative
Date: **April 2025**

Questions



3. Receive an Update on the Regulatory Framework for the Use of AI Systems

Attachment C

Commissioner Michael Humphreys (PA)

Commissioner Doug Ommen (IA)



AI Systems Regulatory Framework Roadmap

STEP 1: Define Principles and Assess Insurer's AI Use

2020

- ✓ Principles of AI

2021 - 2025

Survey Insurers

- ✓ Private Passenger Auto
- ✓ Homeowners
- ✓ Life Insurance
- ✓ Health Insurance
- ✓ Follow Ups

STEP 2: Develop AI Risk Evaluation Tools

2023

- ✓ AI Model Bulletin

2025

Develop Evaluation Tools

To Identify Risks:

- Market Exams
- Financial Exams
- MCAS Data
- Self-Assessment
- Evaluation Metrics

STEP 3: Regulatory Oversight and Accountability

2025

In Coordination with
Other Committees and
Working Groups...

Refine AI Expectations:

- AI Governance
- AI Transparency
- Adverse Outcomes
Accountability
- Prohibited Practices

STEP 4: Identify and Address Gaps in AI Evaluation

2026+

In Coordination with
Other Committees and
Working Groups...

- Identify New AI Risks
or Issues
- Develop Solutions to
Address New Risks

Encourage Innovation By Ensuring AI Systems are Fair, Secure, Safe, and Robust

STEP 2: Develop AI Risk Evaluation Tools

AI Systems Evaluation: Several states already exploring AI evaluations, working under the BDAIWG started discussions last year exploring how states are assessing market and financial risk associated with an insurance company's use of AI

Goals:

- Provide regulators with an efficient, standardized data collection tool(s) to use in an investigation or examination that helps identify and assess financial and market risk associated with AI use.
- Provide insurance companies with guidance and/or tool(s) that align with regulator expectations on AI use to ensure development, implementation, and monitoring follow safe and fair practices.

Tasks for 2025:

- Develop new regulatory tool(s), guidance, and identify if additional MCAS data is needed
- Coordinate the development of review and enforcement tools, resources, guidelines, and training
- Create a self-audit questionnaire for insurers that aligns to regulator evaluation tools and guidance

STEP 3: Regulatory Oversight and Accountability

Governance

Best Practices, Guidance, Templates

AI Testing

Model Training

Drift Detection

Identifying Adverse Consumer Outcomes

Risk Classification

Transparency

AI Use Disclosure

Data Use Disclosure

Degree of Human In the Loop Disclosure

Basis, Source of Data, Reason for Decision

Provide Recourse to Appeal and/or Fix Inaccurate Data

AI Complaint Tracking

Accountability

Clarify Accountability When Using Third Party Data/Models

Adverse Consumer Outcome Reporting to Consumers and Regulators

Identify AI Use Cases that Require Human in the Loop (Prohibited Uses)

Holistic Approach - Collaboration Across Committees and Working Groups

QUESTIONS & NEXT STEPS





4. Hear a Presentation on How Missing Data is Treated and Implications in Ratemaking

Attachment D

Kevin Burke (NAIC)

MISSING DATA

Age	Gender	Occupation	Smoker	Age	Sex	Cancer	Source Locs	Income	Termive	Disease	Recod
62	Male	Business	Non	Over 60	Male	Cancer	12	10000	100	None	10
								MISSING		MISSING	
								MISSING			
			MISSING								
	MISSING			MISSING							
		MISSING							MISSING		
		MISSING			MISSING						

Missing Data Analysis: An (Abbreviated) Actuarial Perspective

Kevin Burke, PhD, ARe, AU, CPCU, FCAS, MAAA
 P/C Modeling Actuary and Data Scientist
 National Association of Insurance Commissioners



Missing Data in Clinical Studies

Missing data can arise for many reasons:

- Respondent refuses to provide household income
- Machinery breaks down in an industrial experiment
- Patient misses an appointment to get blood drawn

Statistical methods have been developed to incorporate missing data into analyses, but the history is much shorter in actuarial analyses and methods are less sophisticated.

Missing Data in Actuarial Analyses

With the advent of Generalized Linear Models (GLM) and credit-based insurance scores in the early 2000's, actuaries encountered missing values.

Score		Description
998	Thin Hit	Consumer does not have enough information to determine a score.
999	No Hit	Consumer is not in credit database.

Modelers responded by binning insurance score and creating separate factor levels in the GLM's.

Missing Data in Actuarial Analyses

Consumer representatives responded by pointing out that

- younger consumers are more likely to have thin hits
- older consumers are more likely to not use credit
- some consumers have religious beliefs that discourage the use of credit
- credit is unavailable in some regions

These categories were often rated as neutral (factor of 1.00) or rated as the average of modeled factors.

Missing Data in Actuarial Analyses

As the use of third-party data has grown, so has the appearance of missing data in modeling data.

Policyholder	Insurer Data
A	X1
B	X2
C	X3

Policyholder	Third-Party Data
A	Y1
B	Y2

Policyholder	Insurer Data	Third-Party Data
A	X1	Y1
B	X2	Y2
C	X3	NA

← Missing data

Using this data is a modeling decision that introduces uncertainty into the modeling process.

Is “Missing” or “Unknown” an Appropriate Risk Class?

ASOP 12 – Risk Classification (for All Practice Areas)

What is a Risk Characteristic?

Measurable or observable factors or characteristics that are used to assign each risk to one of the risk classes of a risk classification system.

Risk
Characteristic



Roof Condition

Excellent

Good

Fair

Poor

Missing

Is the class “Missing”

- Objective?
- Practical?



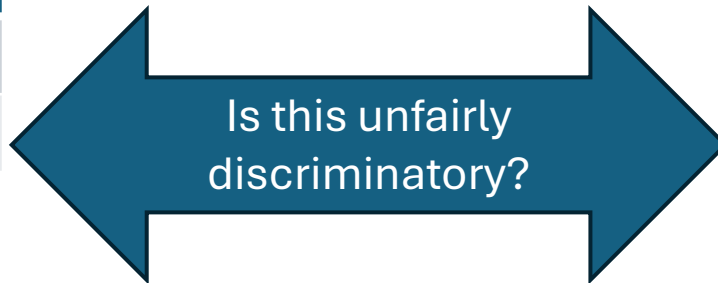
Risk Classes

A set of risks grouped together under a risk classification system.

Unbiased Estimates Determine Rate Relativities

Models use data to make inferences about populations.

Territory	Relativity
Urban	1.00
Rural	0.90



Territory	Relativity
Urban	1.00
Rural	0.95
Missing	0.90

All other things being equal, rural should pay 10% less than rural.

Including “Missing” in your model,

- Changes relationships
- There is no one in the population with a “Missing” Territory.

Questions to Ask About Missing Data

- What is the amount of missing data?
- What are the reasons for the missing data? (Can the policyholder provide the missing information?)
- What method(s) did you use to account for the missing data (e.g. complete-case analysis, multiple imputation)?
- What assumptions were made (e.g. missing at random)?
- Do multiple imputation and complete-case analysis lead to similar conclusions? If not, why?

Van Buuren (pages 343-44)

Main Points

- Using missing data in a model will lead to statistically biased estimates unless the missing data is random
- The use of missing as a risk class appears to conflict with ASOP 12: Risk Classification (for All Practice Areas)
- Ad hoc approaches lead to statistically biased models
- There are more sophisticated approaches to modeling with missing data

Questions or Comments?



References

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