

To: Interested Regulators and Interested Parties of the Risk-Based Capital Model Governance (EX)
Task Force

Date: October 8, 2026

Re: Aspirational Model Governance Exposure

The following aspiration model governance document is exposed with comments due end of the day November 1, 2026. Please comment only on the appropriate path for developing an inventory. Consider commenting on the following as well as your own specific views on a better path:

- The use of a limited pilot rather than designing the full operating inventory.
- A pilot that uses approximately 3–5 models from Life RBC and/or the RBC IRE Working Groups and forming a small focus group of NAIC staff, regulators, and Academy and industry representatives. The pilot will help determine:
 - The appropriate depth of documentation.
 - The information needed to understand methodology, assumptions, data sources, and limitations.
 - What should be retained regarding model changes, monitoring, and decision history.
 - The technology and workflow needed to maintain the information efficiently.
 - Which capabilities stakeholders actually find useful enough to justify costs.
 - Regardless, the pilot will require both staff and technology resources. The added resources will require new funding from the industry via database fees to absorb the added costs.

DRAFT FOR DISCUSSION

Aspirational Risk-Based Capital

Model Risk Management Guidelines

Contents

1 Background 3

1.1 Model, Model Risk, and Intended Purpose Defined 3

1.2 Purpose of Aspirational RBC Governance Guidelines 5

1.3 Elements of the RBC Model Governance Guidelines 5

2 Roles and Responsibilities 6

2.1 Model Developer 6

2.2 Model Owner 6

2.3 Model Users 6

2.4 NAIC Staff 7

3 Aspirational Risk-Rated Model Inventory 7

4 Model Development Guidelines 7

4.1 Model Purpose and Scope 8

4.2 Selecting Data and Model Methodologies and Assumptions 8

4.2.1 Emerging risks 8

4.3 Model Validation 9

4.3.1 Empirical validation of conceptual soundness 9

4.3.2 Validation of model delivery 9

4.4 Impact Assessment 10

4.5 An Assessment of Incentives 10

5 Model Monitoring Guidelines 11

5.1 New Models & Assessing Risks to be Included in the Framework 11

5.2 Monitoring an Existing Model & Model Incidents 12

5.3 Model Monitoring Frequency 12

5.4 Model Update Cost Assessment 12

5.5 Model-Use Materiality Assessment 13

5.6 Communicating Model Monitoring Results and Inventory 13

6 Model Update Guidelines 13

6.1 Model Updates 13

6.2 Models with Ongoing Scheduled Updates 14

7 Model Documentation Guidelines 14

8 Maintenance of the Model Risk Management Guidelines 15

9 Reference Documents 15

10 Appendix 15

10.1 Aspirational Model Inventory and Monitoring Fields 15

10.2 Model Documentation 17

10.2.1 Model Description, Intended Purpose, and Intended Use 17

10.2.2 Methodology and Assumptions 17

10.2.3 Data Choice and Use 17

10.2.4 Limitations and Risks 17

10.2.5 Validation and Sensitivity Analysis 17

10.2.6 Resource Repository (Key Definitions, Model Related Files, Key Contacts) 18

10.2.7 Vendor and Third-Party Models (relevant for models that are regularly updated) 18

1 Background

As explained in the Risk-Based Capital (RBC) Preamble, the Capital Adequacy (E) Task Force of the Executive (E) Committee and its RBC Working Groups oversee the RBC formula and the process for implementing changes to it. These Aspirational Model Risk Management Governance Guidelines provide a framework to help ensure that RBC models meet their intended regulatory purposes by ensuring that their risks are appropriately monitored and managed. The guidelines are aspirational for CATF and its Working Groups to apply, with regulatory discretion and limited-resource considerations in mind.

The Preamble outlines eleven Principles for the purpose and use, and maintaining and updating RBC requirements, along with historical context. It explains that the purpose of RBC requirements is to identify potentially weakly capitalized companies. RBC requirements are primarily used to facilitate regulatory action with respect to weakly capitalized companies. RBC requirements may be used for other purposes, but such uses must not distort or redefine their purpose. As explained in the Transparency and Process Principles, maintaining and updating RBC requirements must adhere to standards that ensure clear, complete, and transparent communication and documentation of proposed and adopted updates, methodologies, and supporting rationale. Maintaining and updating RBC requirements must adhere to model risk management standards, relying on data-driven methodologies with assessments of model performance and model validation when possible, acknowledging the need to rely on expert judgment and proxies, significantly so in some cases, and the use of interim solutions.

RBC requirements should be updated when a change could meaningfully impact the regulator's assessment of the solvency risk for all or an identifiable segment of companies. RBC requirements should be guided by the principle of equal capital for equal risk, consistent in their statistical safety levels and time horizons, appropriate for the underlying risk, unless there are substantial differences in the nature of the risk in the context of the business model (e.g., life vs property & casualty) to warrant alternative treatments. RBC requirements should reflect measurable risks that can impact solvency, including the mitigating effects of risk management. They should consider only the factors that affect solvency risk.

They should be sufficiently precise to assess solvency risk, while avoiding unnecessary complexity. They should be grounded in Statutory Accounting and reserving. They should be updated to incorporate emerging risks (including macroprudential risk) by the time they become material to the industry or an identifiable segment of companies.

Recognizing the vast number of potential refinements that could be made to RBC requirements at any given time, the groups tasked with updating and maintaining the RBC model should use regulatory judgment to prioritize changes, considering their necessity, materiality, time and resource intensity, and other relevant considerations.¹

1.1 Model, Model Risk, and Intended Purpose Defined

This document does not provide a single definition of a model or model risk but rather points to the definitions used in well-accepted standards in [Actuarial Standard of Practice No. 56, Modeling \(ASOP No. 56\)](#), and [SR 11-7](#) of the Federal Reserve System and the Office of the Comptroller of the Currency. While those standards are often framed as model risk management guidelines for financial institutions, including insurance companies, this document applies those concepts to RBC models.

¹ See also the [RBC for Insurers Model Act \(Model Law 312\)](#), NAIC 2012, and [RBC for Health Organizations Model Act \(Model Law 315\)](#), NAIC 2021.

ASOP No. 56 defines a model as: *A simplified representation of relationships among real world variables, entities, or events using statistical, financial, economic, mathematical, non-quantitative, or scientific concepts and equations. A **model** consists of three component an information **input** component, which delivers **data** and **assumptions** to the **model**, a processing component, which transforms **input** into **output**, and a results component, which translates the **output** into useful business information.*

SR 11-7 defines models as: *A quantitative method, system, or approach that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into quantitative estimates. A model consists of three components:*

- 1. an information input component, which delivers assumptions and data to the model;*
- 2. a processing component, which transforms inputs into estimates; and*
- 3. a reporting component, which translates the estimates into useful business information.*

...

The definition of model also covers quantitative approaches whose inputs are partially or wholly qualitative or based on expert judgment, provided that the output is quantitative in nature.

ASOP No. 56 defines Model Risk as: *The risk of adverse consequences resulting from reliance on a model that does not adequately represent that which is being modeled, or the risk of misuse or misinterpretation.*

SR 11-7 explains: *The use of models invariably presents model risk, which is the potential for adverse consequences from decisions based on incorrect or misused model outputs and reports... Model risk occurs primarily for two reasons:*

- 1. The model may have fundamental errors and may produce inaccurate outputs when viewed against the design objective and **intended business uses**. The mathematical calculation and quantification exercise underlying any model generally involves application of theory, choice of sample design and numerical routines, selection of inputs and estimation, and implementation in information systems. Errors can occur at any point from design through implementation. In addition, shortcuts, simplifications, or approximations used to manage complicated problems could compromise the integrity and reliability of outputs from those calculations. Finally, the quality of model outputs depends on the quality of input data and assumptions, and errors in inputs or incorrect assumptions will lead to inaccurate outputs.*
- 2. The model may be used incorrectly or inappropriately. Even a fundamentally sound model producing accurate outputs consistent with the design objective of the model may exhibit high model risk if it is misapplied or misused. Models, by their nature, are simplifications of reality, and real-world events may prove those simplifications inappropriate. This is even more of a concern if a model is used outside the environment for which it was designed... Decision makers need to understand the limitations of a model to avoid using it in ways that are not consistent with the **original intent**. Limitations come in part from weaknesses in the model due to its various shortcomings, approximations, and uncertainties. Limitations are also a consequence of assumptions underlying a model that may restrict the scope to a limited set of specific circumstances and situations.*

ASOP No. 56 defines Intended Purpose as: *The goal or question, whether generalized or specific, addressed by the model within the context of the assignment. Section 3.1.2 of the ASOP states that: When selecting, reviewing, or evaluating the model, the actuary should confirm that, in the actuary's professional judgment, the model reasonably meets the intended purpose.*

SR 11-7 explains that: *An effective development process begins with a **clear statement of purpose to ensure that model development is aligned with the intended use**. The design, theory, and logic underlying the model should be well documented and generally supported by published research and sound industry practice. The model methodologies and processing components that implement the theory, including the mathematical specification and the numerical techniques and approximations, should be explained in detail with particular attention to merits*

and limitations. Developers should ensure that the components work as intended, are appropriate for the intended business purpose, and are conceptually sound and mathematically and statistically correct. Comparison with alternative theories and approaches is a fundamental component of a sound modeling process.

1.2 Purpose of Aspirational RBC Governance Guidelines

The Governance Guidelines help ensure that RBC models adhere to their Principles and maintain their strategic foundation, with revisions to the RBC framework aimed at enhancing it and furthering the principle of ‘equal capital for equal risk.’ In addition, the Governance Guidelines should improve efficiency by avoiding the need to reverse-engineer the rationale behind poorly documented models. Documented processes and procedures will enable model developers and reviewers to implement changes more quickly. The transparency of the framework should also aid in understanding any model limitations, so that conclusions drawn from model results are properly informed.

1.3 Elements of the RBC Model Governance Guidelines

These Aspirational RBC Model Risk Management Guidelines are composed of six elements:

1. **Roles and responsibilities.** Maintaining and updating RBC components can involve a wide range of stakeholders. It is important that the roles and responsibilities involved in developing, implementing, monitoring, and maintaining are understood and documented (see *Section 2*). Parties are designated as the model developer, model owner, and model user.
2. **Risk-ranked model inventory.** Stakeholders should aspire to inventory models, ideally ranked by model risk rating. This could be based on the model’s potential impact on insurer solvency assessment (i.e., the significance of the business practice to which the RBC model is applied), which could involve an assessment of the materiality of the model’s use, an assessment of the model’s appropriateness of use, with consideration given to model complexity, potential changes to business practices, and when the model was last monitored (see *Section 3.3*). When combined with an assessment of model revision costs, the process enables the appropriate prioritization of limited resources. Acknowledging the resources needed to inventory models, CATF and its Working Groups should consider prioritizing inventorying newly developed models.
3. **Model development guidelines.** *Section 4* includes aspirational model development guidelines that include a statement of a model’s purpose and scope; criteria for selecting data and model methodologies and assumptions; model validation; and an assessment of impact and incentives. Generally, the most robust requirements will apply to the models with the potential for the highest Model Risk Ratings, while less rigorous requirements may apply to those with lower Model Risk Ratings.
4. **Model monitoring guidelines.** *Section 5* outlines guidelines for ongoing model monitoring to ensure the timely identification of models that are not suitable for use, an assessment of the materiality of their use, and an evaluation of their potential impact on solvency assessment (i.e., the significance of the business practice). The process is crucial for maintaining accurate Model Risk Ratings.
5. **Model update guidelines.** Model update guidelines provide the process to ensure that model updates are controlled, accurate, and that their impact is well understood, minimizing unintended consequences (see *Section 6*).
6. **Model documentation guidelines.** Aspirational model documentation guidelines are described in *Section 7* and ensure that model updates are appropriately documented, traceable, and understandable to qualified reviewers. Model documentation should be updated to reflect any revisions to existing models, including their assumptions, methodologies, and data inputs. Documentation guidelines include an articulation of the model’s intended purpose, its appropriate use, methodologies, limitations, and associated risks.

2 Roles and Responsibilities

When relevant, parties are designated as model developers, model owners, and model users. Delegation should be documented to avoid accountability gaps.

2.1 Model Developer

RBC models are traditionally developed externally, often by the American Academy of Actuaries (Academy) or industry, and, in some cases, rely on vendor solutions.² Model developers can have varied backgrounds, including actuarial science and financial engineering. Their experience, judgment, and technical knowledge significantly influence the selection of appropriate inputs and processing components. The training and experience of developers exercising such judgment affect the extent of model risk. Responsibilities of Model Developers include:

- Adhering to ASOP No. 56 when applicable.
- Adhering to Model Development Guidelines (see *Section 4*).
- Adhering to Model Documentation Guidelines (*Section 7*).
- Model validation, unless there is a separate and independent model validation function (*Section 4.3*).

2.2 Model Owner

NAIC Committees, Task Forces, Working Groups, and staff can be model owners. They are responsible, possibly through delegation, for setting the threshold for aspirational guidelines, and the degree to which:³

- Models are identified and inventoried.
- Models are monitored and remain appropriate for use, and adhere to development guidelines.
- Models adhere to Acceptance Criteria (see *Section 4.2*), aligning with RBC Principles.
- Model Users and other stakeholders can review and potentially challenge proposed updates through the public comment process. Model owners are responsible for considering comments, ensuring that responses are documented, and resolving material concerns before adoption.
- Coordination across NAIC groups. Models underpinning RBC requirements often rely on methodologies, inputs, and assumptions that depend on or are also used in other components of the regulatory interconnected framework (e.g., Principle-Based Reserves for life companies).

2.3 Model Users

NAIC Committees, Task Forces, Working Groups, and staff, U.S. insurers, state insurance regulators, and possibly delegated organizations can be model users. Model users who are subject matter experts can provide valuable business insights during model development and play a critical role in identifying issues, proposing solutions, scoping testing, and contributing to broader model governance efforts that may not be readily apparent to regulators and NAIC staff. Model users would report issues and submit a request to update a model. Stakeholders affected by model outcomes may question the methods or assumptions underlying the models, particularly if a user is significantly affected by the outcome and does not view it as providing the necessary insights. Such questioning can be healthy if it is constructive and prompts model developers to explain and justify the models' assumptions and design. Model users' responsibilities, possibly through delegation, include:

² It is worth pointing out that the Academy has additional guidelines, such as [Model Risk Management](#), May 2019, and the [Model Governance Checklist, Some Considerations for Practicing Life Actuaries](#), April 2017.

³ The title of a model owner was motivated by the American Academy of Actuaries' [Model Risk Management](#) May 2019, with concepts borrowed from SR 11-7. The title is different from GOES Model Governance, which has Conning as the model owner, the legal owner of GOES.

- Implementing models.
- Flagging model risks and governance issues, and providing independent feedback, for consideration.
- Actively engaging in the public comment process, providing a critical review of proposed revisions.
- Reviewing model update results and model documentation.

2.4 NAIC Staff

NAIC staff have a range of overlapping responsibilities, including Model Owners and Model Users. Their responsibilities can include, possibly through delegation, monitoring and maintaining the model governance framework:

- Maintain the process to review and evaluate whether RBC requirements are appropriate for use, which includes maintaining an aspirational RBC Model Inventory, described in *Section 3.3*.
- Ensuring adherence to the NAIC [Open Meeting Policy](#) and the NAIC Policy Statement: *Maintaining and Updating RBC Requirements*, as outlined in *Section 6.1*.
- Independent model monitoring (e.g., Model Office Tests).
- Bring any governance issues for consideration.

3 Aspirational Risk-Rated Model Inventory

A Model Inventory provides a structured, transparent view of the system of models and their associated model risks. It serves as the central repository for information on model ownership, purpose, appropriate use, and performance, ensuring transparency and accountability across models used in the RBC framework, and supports prioritization of limited regulatory time and resources when maintaining and updating RBC components, consistent with the materiality of models and their potential impact on solvency assessment. Acknowledging the resources needed to inventory models, CATF and its Working Groups should consider prioritizing inventorying newly developed models.

A model risk rating framework categorizes models according to their relative model risk. Models are assigned a risk rating (high, medium, or low) based on the materiality of their use and their potential impact on solvency assessment (i.e., the significance of the business practice to which the RBC model is applied), an assessment of the model's appropriateness of use, with consideration given to model complexity, potential changes to business practices, and when the model was last monitored. Models that are assigned a high-risk rating may be subject to heightened requirements, including the possibility of developing their own model risk management guidelines (e.g., as is the case with GOES). Models that are assigned a low-risk rating may be subject to lower governance requirements.

Appendix 10.1 - Aspirational Model Inventory Fields provides potential fields that CATF and its Working Groups should consider tracking. Editing rights are limited to NAIC staff and any delegates.

4 Model Development Guidelines

Model development guidelines help ensure model design and estimation align with their intended purpose, using sound methods that conform to industry standards, appropriate data and assumptions, and sufficient testing to ensure technical correctness and reliability. Model development guidelines encompass a statement of the model's purpose and scope, guidelines for selecting data and methodologies, model validation, and an assessment of the model's impact and incentives.

RBC models are traditionally developed externally, underscoring the need to uphold a minimum standard for model development. In some cases, the RBC model relies on vendor solutions, requiring ongoing updates (e.g., annual), as is the case with CAT-risk or applications of GOES within C-3. Models that are material, assessed as having the

potential for a high risk rating, and require ongoing updates should have model development guidelines articulated within their model risk management guidelines, including processes for routine and more extensive model updates.

4.1 Model Purpose and Scope

As articulated in SR-11-7, *[a]n effective development process begins with **a clear statement of purpose to ensure that model development is aligned with the intended use***. The statement ensures that the model can be developed to align with its purpose.

4.2 Selecting Data and Model Methodologies and Assumptions

The appropriateness of the model depends heavily on the selection of data and the methodologies used. Data should be relevant, sufficiently reliable, and consistent with the model's intended purpose. Actuarial judgment is required to determine whether internal or external data, proxies, or expert judgment are suitable for the situation, and whether any limitations materially affect the results. Assumptions should be clearly aligned with observed experience or credible sources, with justification provided for their use, particularly where uncertainty or estimation risk is high. The methodology should reflect an understanding of the system being modeled and account for known sensitivities and limitations. As explained in SR-11-7, *[t]he design, theory, and logic underlying the model should be generally supported by published research and sound industry practice*.

The model selection process is intended to ensure alignment with the intended purpose. It can include **Acceptance Criteria** comprised of **Quantitative Guidelines** that serve as aspirational benchmarks for what an RBC component is intended to measure (e.g., statistical safety level) and other quantitative metrics, such as statistical precision thresholds, as well as qualitative features agreed upon as a minimum benchmark for a model's suitability for its intended purpose. If one or more criteria fail, it may indicate that a revision to the model is necessary. However, judgment is required in making this decision. It may also include an evaluation of alternative models or methodologies, consideration of model complexity in relation to the problem being addressed, assessment of the availability and quality of input data, and alignment with relevant standards. This process may involve a review process to ensure that the selected model is appropriate for its intended use.

The selection process should assess individual components and the overall functioning within the RBC framework, taking into account potential dependencies and interactions. The process should confirm that the model is accurate, robust, and stable as intended, and that it meets the standard of reasonableness in both its individual assumptions and their aggregate effects on output. This process overlaps with model validation.

4.2.1 Emerging risks

New and emerging risks, by their nature, often lack long historical data series, stable relationships, and well-established methodologies. As a result, greater reliance may be placed on external data sources, scenario analysis, expert judgment, proxies, and simplified or interim modeling approaches, with an existing RBC charge possibly applied at regulators' discretion. Examples include catastrophe and climate-related risks, cyber risk, and new asset classes and evolving investment trends, such as the increased use of alternative assets.

When modeling emerging risks for RBC purposes, data limitations, structural uncertainty, and heightened estimation risk should be acknowledged. Assumptions and methodologies should be transparent, conservatively framed where appropriate, and clearly linked to the intended purpose of the solvency assessment rather than precision or pricing accuracy. The absence of credible data should not preclude inclusion of a risk in RBC; however, it should inform the choice of methodology, the degree of model complexity, and the interpretation of results.

For emerging risks, Acceptance Criteria may rely more heavily on qualitative benchmarks, directional reasonableness, sensitivity testing, stress scenarios, and comparisons to alternative approaches rather than strict statistical calibration targets. The development process should assess whether the model reasonably captures the transmission of the risk to solvency under adverse conditions, including tail behavior and potential interactions with other risks, even if parameter estimates are imprecise.

Given the evolving nature of emerging risks, models addressing them should be subject to more frequent review and updating, with explicit plans for incorporating new data, research, and industry experience as they become available. Interim solutions may be appropriate, provided their limitations are documented, their use is clearly bounded, and their continued appropriateness is reassessed as the risk matures and becomes better understood.

4.3 Model Validation

Model validation provides assurance that the model is conceptually sound, empirically reliable, and operationally correct. In some cases, independent model validation may be warranted. Validation includes two complementary categories: Empirical validation of conceptual soundness and validation of model delivery.

4.3.1 Empirical validation of conceptual soundness

Empirical validation assesses whether the model's underlying structure, assumptions, and parameterization accurately represent the economic reality the model is intended to describe. Recognizing that the RBC requirements are often heavily based on judgment, key elements can include:

- **Back-testing.** Compare model-generated variables to realized historical values over multiple horizons.
- **Quantify predictive accuracy using defined statistical measures** (e.g., mean error, root-mean-square error, coverage probability, calibration slope).
- **Evaluate whether deviations fall within pre-established tolerance ranges**, such as persistent bias or excessive volatility triggers.
- **Empirical fit and distributional testing** assess whether simulated distributions of key variables align with historical distributions through appropriate statistical techniques. It can involve assessing moments (mean, variance, correlations) and tail characteristics that are consistent with economic history and with the model's theoretical design.
- **Benchmark comparisons** assess the model's performance against generally accepted points of reference.
- **Sensitivity and stability testing** verify that output responses are directionally and quantitatively consistent with expectations or benchmarks.
- **Component and comprehensive soundness** ensure individual modeling choices are sound and their interactions produce an overall framework with intended dynamics.

4.3.2 Validation of model delivery

Validation of model delivery ensures that the implemented model, data processes, and control framework accurately execute the intended methodology and deliver reliable results for end users. Key components include:

- **Input validation.** Input validation may include reviewing source data to ensure its robustness and appropriateness for model development.
- **Calculation validation.** Calculation validation may include validation of model components, ranging from independent full model replication and independent sample calculations to process approximation, formula inspection, testing of interim calculations, and verification of results. In addition to the Model Developer's calculation validation, Model Owners can perform independent user acceptance testing for any software modifications required to implement the NAIC model.
- **Output validation.** For models that require ongoing updates, output validation may be based on the analysis of scheduled outputs.

4.4 Impact Assessment

Impact assessments evaluate the potential effect of model changes, updates, or newly developed models on results, decisions, and regulatory outcomes. Its purpose is to ensure that model modifications are well understood prior to implementation and that stakeholders can assess whether the resulting output remains reasonable, stable, and aligned with the model's intended purpose, thereby limiting unintended consequences.

Impact assessment activities should be commensurate with the model's materiality and risk rating and should include both quantitative and qualitative evaluations. Where applicable and practical, the analyses should include an assessment of changes to an RBC component and the overall impact on RBC requirements, incorporating interactive effects within the framework to ensure accuracy and reliability. Given the need to sequence activities and the potentially significant effort required for some impact analyses (e.g., Field Testing), the scope of impact assessment should be planned for as soon as practicable. Key elements include:

1. **Regression testing.** Regression testing should be performed to confirm that model changes produce expected and explainable differences relative to the prior approved version of the model. The analysis should isolate the impact of the specific change(s), verify that unchanged components continue to behave consistently, and identify any unintended effects or anomalies. Results should be compared against baseline outputs to ensure that differences are attributable to the intended model modifications and that overall results remain reasonable, stable, and aligned with the model's design.
2. **Sensitivity and benchmark analysis.** Sensitivity and benchmark analysis should be used to evaluate the stability of model results to changes in key assumptions or inputs and to compare outputs against historical experience, prior model versions, or peer benchmarks. The assessment should quantify and explain material differences, ensure that observed changes are justifiable, and confirm that the model continues to meet its intended purpose.
3. **Documentation and Governance Review.** All impact-assessment results, assumptions, and conclusions should be documented and reviewed by the Model Owner and Model Users prior to implementation.
4. **Model Office Testing.** Model Office Testing can be conducted on stylized or representative business activities prior to implementing a material model update to help assess model performance, directional accuracy, and potential implications to capital requirements or reported results.
5. **Industry Field Testing.** Industry Field Testing can be conducted on stylized business activities prior to implementing material model updates to assess model performance, consistency, and comparability across insurers. Such testing can provide insight into systemic effects, calibration consistency, and whether further refinements or parameter adjustments are warranted before adoption.

4.5 An Assessment of Incentives

RBC requirements, by design, differentiate capital charges according to the risk profile of business activities, whether those activities involve policy offerings, investment strategies, or other risk exposures. Material regulatory requirements can influence insurers' behavior, affecting product design, investment strategies, reinsurance strategies, and competitive dynamics.⁴ These effects may be desirable and deliberately considered in model development as an acceptance criterion (for example, remove disincentives to prudent hedging in Life RBC C-3). Therefore, material RBC model updates should include a qualitative assessment, and, where practical, a quantitative assessment, of reasonably foreseeable and material resulting incentives, along with their implications. The assessment should be proportionate to the incentive's materiality. Reasonably foreseeable and material resulting incentives can include:

- **Risk management**, including prudent hedging.

⁴ See, for example, [Efforts to Reform NAIC Investment Guidelines: Lessons Learned from History](#), Bridgeway Analytics, 2023.

- **Product design and policyholder impact**, including potential effects on pricing, product availability, or distribution.
- **Market and competitive effects**, including disproportionate impacts across identifiable insurer segments.
- **Alignment with NAIC Policy Objectives**, beyond maintaining solvency protection, such as promoting fair competition and supporting access to insurance.
- **Broader systemic and operational considerations**, including changes in asset allocation, reinsurance strategies, or cross-sector risk exposures.

5 Model Monitoring Guidelines

This section outlines aspirational guidelines for ongoing model monitoring to ensure the timely identification of models that are not suitable for use, an assessment of the materiality of their use, and an assessment of their potential impact on solvency assessment (i.e., the significance of the business practice). The process is crucial for maintaining accurate Model Risk Ratings. When combined with an assessment of model revision costs, the process enables the appropriate prioritization of limited resources.

5.1 New Models & Assessing Risks to be Included in the Framework

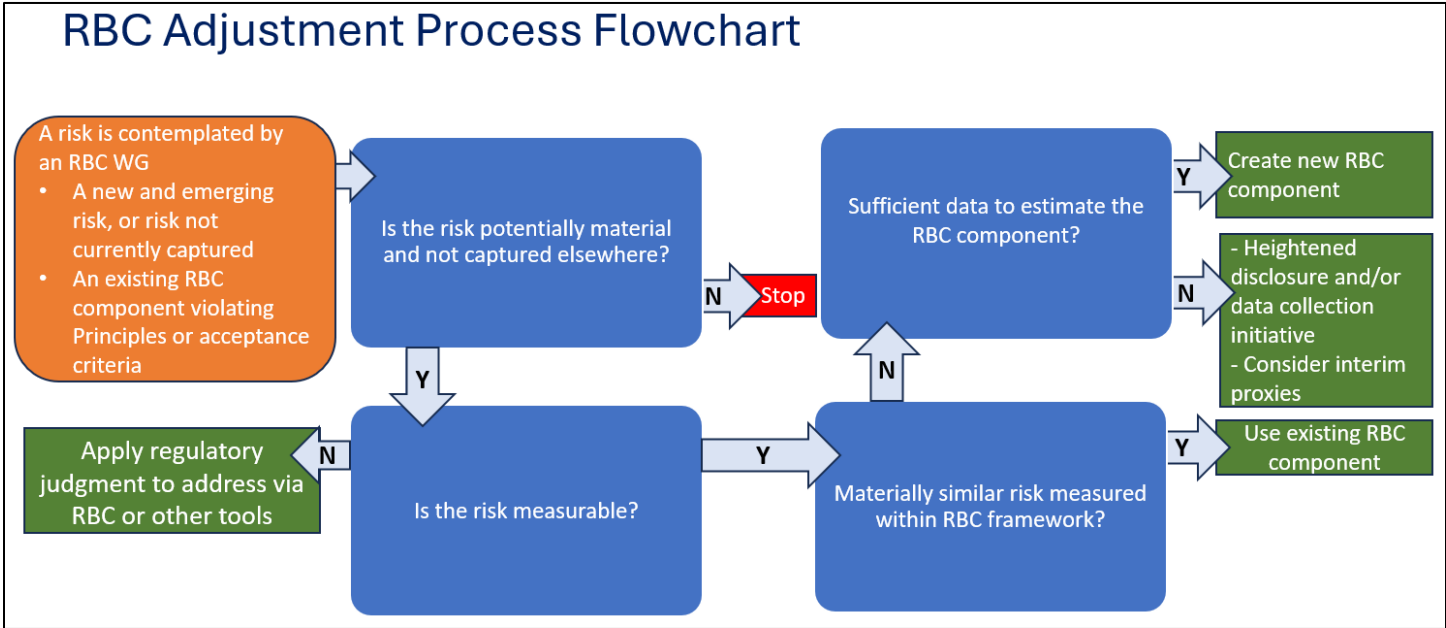
RBC requirements are one tool in the broader solvency oversight framework. It enables regulators to take corrective measures to ensure policy obligations are met, while acknowledging that not all risks can be accurately measured by a formulaic capital charge. When a risk is identified as not captured in a model or the broader RBC framework, an assessment is needed to determine whether RBC is the most appropriate tool for identifying and overseeing it. The assessment should consider whether the risk is best governed by another tool within the framework, such as ORSA processes, or is primarily idiosyncratic and best managed through company-specific governance or supervisory review.

Figure 1 provides a schematic of key considerations when adjusting the RBC formula. The first considerations are materiality and whether the risk is not captured elsewhere in the framework. The next consideration is whether the risk is measurable and materially similar to risks already measured within the framework. Finally, whether sufficient data exists to estimate an RBC component is available, and whether heightened disclosure is needed.

The flowchart highlights the need for regulatory judgment and the possible need for interim proxies. The flowchart builds on concepts from the Academy's [Principles for Structured Securities RBC](#), as well as the [Asset Concentration Flow Chart](#), which provides a non-authoritative framework for evaluating whether specific asset-related exposures should be reflected in the RBC formula or addressed through other supervisory tools, such as targeted examinations, stress testing, or qualitative risk assessments. It assists regulators and industry participants in determining:

- Whether a given exposure represents a quantifiable risk suitable for inclusion in the RBC calculation;
- Whether the exposure is already captured elsewhere in the framework (e.g., credit, market, or operational risk components); and
- Whether it should instead be managed through governance, disclosure, or supervisory review mechanisms.

Figure 1: Key considerations when adjusting RBC formula



5.2 Monitoring an Existing Model & Model Incidents

Monitoring an existing model for its appropriate use involves assessing its attributes against **Acceptance Criteria**, which include quantitative metrics such as **Quantitative Guidelines** and **Qualitative Features** agreed upon as a minimum benchmark for a model’s suitability for its intended purpose. Examples of Quantitative Guidelines include the statistical safety level or risk horizon used in estimating the model.

When a model fails to meet its acceptance criteria, possibly because a model or operational error is identified or the model is no longer applicable to the current environment, an assessment should be documented as described in *Section 5.6*. As discussed in *Section 4*. If one or more criteria fail, it may indicate that a revision to the model is necessary. However, judgment is required in making this decision.

Notably, if a model or operational error is identified (i.e., a model incident), the documentation should include a proportional assessment of the root causes and the necessary controls to prevent the error from recurring (i.e., “Postmortem”).

5.3 Model Monitoring Frequency

Model monitoring frequency should be specific to each model and closely tied to its risk rating, intended use, and the materiality of its output. Detailed should be inventoried. Higher-risk or higher-materiality models should be monitored more frequently, while lower-risk models may require less frequent review. CATF and its Working Groups should determine a minimum cadence for monitoring models (e.g., every 10 years), and when there is a significant increase in the materiality of its use (see *Section 5.4*), either for the industry as a whole or for an identifiable segment of companies.

5.4 Model Update Cost Assessment

Ideally, a model identified as unsuitable would be accompanied by a description and an assessment of the effort/cost required to revise it to at least the point where it aligns with its intended purpose and adheres to these

Model Risk Management Guidelines. The assessment and cost estimates should align with the requirements outlined in the Model Development Guidelines in *Section 4*.

However, as discussed in *Section 4*, RBC models are traditionally externally developed and, in some cases, rely on vendor solutions. Unless a model has its own model risk management guidelines, an estimate of the revision cost is likely not easily attainable, and significant judgment will be needed to incorporate any cost estimate into prioritization decisions.

5.5 Model-Use Materiality Assessment

An assessment of model-use materiality involves quantifying its application and its potential impact on solvency assessment (i.e., the significance of the business practice to which the RBC model is applied). Model use can be deemed material when it has the potential to meaningfully impact a regulator's assessment of solvency risk for all companies or an identifiable segment of companies. Quantitative thresholds, such as the proportion of liabilities, premiums, or RBC requirements that are influenced by the model's output, may be used to support the materiality assessment.

5.6 Communicating Model Monitoring Results and Inventory

To the extent prioritized, results from model monitoring and model incidents, including the model's risk rating, are documented and recorded in the model inventory as outlined in *Section 3.3* and *Section 10.1 – Appendix: Aspirational Model Inventory and Monitoring Fields*, which is intended to streamline the prioritization of limited resources. Significant shortcomings should be communicated to Model Owners, Model Users, and Model Risk Governance stakeholders in a manner that CATF and its Working Groups see fit.

6 Model Update Guidelines

CATF and its Working Groups will determine the process for updating each model, beyond any applicable Model Risk-Inventory, Development, and Documentation Guidelines (*Sections 3, 4, and 7*), and the nature of the update.

6.1 Model Updates

Models are updated for a range of reasons, including **routine scheduled updates, model enhancements, model corrections, or cosmetic updates**. CATF and its Working Groups will determine the necessary governance, taking into account complexity (e.g., coordination with a vendor) and materiality. For example, the governance needed for changes in reporting lines that do not impact RBC requirements may be limited to updating the model inventory, if applicable. The following process generally applies to model updates:

1. Requests to update models may be scheduled or initiated by members of CATF or its Working Groups or Subgroups, Interested Regulators, or Interested Parties.
2. If applicable, assigned and inventoried a Model Risk Rating and Model Revision Cost Assessment as outlined in *Section 5*.
3. If and when the NAIC Committee Structure determines that a model update is warranted, roles and responsibilities are assigned. Scheduled updates would already have this in place.
4. Considerations for Model Risk will help CATF and its Working Groups determine the applicability of Model Development Guidelines, including acceptance criteria, and Model Documentation Guidelines.
5. A completed [RBC Proposal Form](#) that should follow the [RBC Proposal Instructions](#).
6. Accessible vendor model, when applicable (e.g., CAT-risk or GOES within C-3).
7. Reviewed, considered, and adopted through the NAIC committee structure.

6.2 Models with Ongoing Scheduled Updates

In some cases, models require ongoing updates (e.g., annually), as with CAT-risk or GOES applications within C-3. In such instances, roles and responsibilities, as well as processes such as routine and more extensive model updates, documentation, training, and user support, should be agreed upon by stakeholders. Consideration should be given to the following roles and responsibilities:

- **Vendor (Model Developer).** The nature of models that require ongoing updates often means they rely on production environments. Those environments should generally have management controls, with separation of duties (e.g., signoff from the development team to advance the model from the development environment to the testing environment; signoff from the testing team that testing was completed and reviewed; and signoff that the tested model was moved successfully to the production environment). Vendors should provide those details, which should generally reside in the model's own Model Risk Management Guidelines. The model developer is responsible for ensuring that scheduled model updates comply with the Model Development and Documentation Guidelines, including cases in which only model parameters are updated. Careful consideration should be given to:
 - Model validation and model performance.
 - Impact assessment, including Field Testing and Model Office Testing with sensitivities to needed resources.
 - Model user support, including summary reports on the frequency and types of questions submitted, and steps taken to address any concerns.
 - Model documentation, with sensitivities to any proprietary aspects of the model.
 - Processes for non-scheduled model updates when unexpected errors arise.
 - Training Materials for the Model Users.

Vendors should generally be required to provide an attestation to NAIC staff that the above controls are in place and being performed. Vendors should expect to attend NAIC meetings as needed to respond to questions and comments received during the exposure period.

- **Model Owner and Model User, including NAIC staff.** Models that require ongoing updates can be complex and include many interdependent components. Careful consideration should be given to roles and responsibilities with:
 - Model identification and inventory.
 - Model adherence to Development, Monitoring, Update, and Documentation Guidelines.
 - Independent model monitoring (e.g., Model Office Tests)
 - Coordination across Model Users, including across NAIC groups.
 - Bringing any model risks and governance issues, and providing independent feedback, for consideration.
 - Possibly performing independent analysis and benchmarking.
- **NAIC Committee Structure (Model Owner).** Reviews and adopts all scheduled model updates, including model recalibrations and changes to acceptance criteria.

7 Model Documentation Guidelines

The Model Documentation Guidelines help ensure that model updates are appropriately documented, traceable, and understandable to qualified reviewers. Model documentation must be updated to reflect any revisions to existing models, including their assumptions, methodologies, and data inputs. When applicable, the model developer is responsible for completing the documentation, and the model owner is responsible for reviewing and approving it.

Acknowledging that models vary significantly in their potential Model Risk Rating and complexity, documentation requirements will depend on the model's purpose, risk classification, and degree of reliance within the RBC

framework. Higher-risk or more complex models will require a greater depth of documentation, particularly in areas such as methodology, assumptions, and validation.

Models should aspire to be documented in sufficient detail to enable an independent reviewer to understand, replicate (where practical), and evaluate the model's design, inputs, assumptions, and outputs.

The key components of model documentation are detailed in *Section 10.2* and include:

1. Model Description, Intended Purpose, and Intended Use
2. Methodology and Assumptions
3. Data Choice and Use
4. Limitations and Risks
5. Validation and Sensitivity Analysis
6. Resource Repository (Key Definitions, Model Related Files, Key Contacts)
7. Vendor and Third-Party Models (relevant for models that are regularly updated)

8 Maintenance of the Model Risk Management Guidelines

The need to regularly maintain the RBC Model Risk Management Guidelines is particularly relevant for models that are updated frequently, especially those that are dynamic and face operational complexities, including coordination among regulators, a vendor, and the industry (e.g., GOES). Thus, the RBC Model Risk Management Guidelines should be reviewed by CATF and its Working Group and updated as they see necessary. The process for maintaining and updating the Guidelines should aspire to follow the practices laid out within this document.

9 Reference Documents

The following documents were used as references in the creation of this model governance document:

1. [Model Governance Checklist](#), August 2016 American Academy of Actuaries, Principle-Based Reserves Checklist Subgroup.
2. [Actuarial Standard of Practice No. 56 Modeling](#), Actuarial Standards Board, December 2019.
3. [Supervisory Guidance on Model Risk Management](#) (SR 11-7), Board of Governors of the Federal Reserve System Office of the Comptroller of the Currency, April 4, 2011.
4. [Model Governance Some Considerations for Practicing Life Actuaries](#), Model Governance Practice Note Work Group of the American Academy of Actuaries, April 2017.
5. [Model Risk Management](#), Model Risk Management Work Group of the ERM/ORSA Committee of the American Academy of Actuaries, May 2019.
6. [NAIC Policy Statement on Open Meetings](#), April 1, 2024, NAIC.
7. [Accounting Policies and Procedures Manual](#), March 2025, NAIC.
8. [Draft GOES Model Governance](#), NAIC GOES (A/E) Subgroup.
9. [RBC for Insurers Model Act \(Model Law 312\)](#), NAIC 2012.
10. [RBC for Health Organizations Model Act \(Model Law 315\)](#), NAIC 2021.

10 Appendix

10.1 Aspirational Model Inventory and Monitoring Fields

Model Inventory Fields

- **Model name**
- **Model use identifiers**
 - Include RBC Instructions reporting lines
 - Include ASI and ASB reporting lines

- Include relevant SAPs, any relevant dependencies on the VM and/or P&PM
- **Model documentation and summary of key fields**
 - Model description
 - Model intended purpose and use
 - Dates last updated
 - Summary of key updates since the previous update
 - Links to documentation
 - Any associated model risk management guidelines specific to the model (e.g., GOES)
- **Model status.** Under development, proposed, adopted & future effective date, adopted & active, actively monitored, model update requested, or inactive.
- **Roles and responsibilities, and key points of contact, including any relevant vendors**
 - Model developer and validator if relevant
 - Model owner
 - Model user
- **Model Monitoring**
 - Model monitoring schedule and frequency
 - Model Risk Rating and rationale for the rating
 - Model monitoring status. A summary of the model assessment against Acceptance Criteria, including Quantitative Benchmarks and metrics, and qualitative features agreed upon as a minimum benchmark for a model's suitability for its intended purpose and appropriate for use.
 - The date and results of the most recent monitoring and any corrective actions.
 - The data and results of the most recent model-use materiality summary.
 - Link to Model Monitoring Results Document
- **Model Update Requests and scheduled model updates**
 - Model Update Category
 - Model Update Request sponsor
 - Link to Model Update Request Document and any results associated with the update analysis
 - Model Update Cost Assessment
 - Vendor Model (Y/N)
 - Scheduled Update (Y/N)
 - Off-Schedule Update Rationale
 - Target date adopted.
 - Effective or target effective date.
 - RBC Proposal Form status and date adopted, exposed, rejected, deferred, referred to another group, or other)
 - Link to RBC Proposal Form

Model Monitoring Fields

- Monitoring schedule and frequency
- Model Risk Rating and rationale for the rating
- Model monitoring status and model incidents. An assessment of the model against Acceptance Criteria, including Quantitative Benchmarks and Qualitative Features, agreed upon as a minimum benchmark for a model's suitability for its intended purpose and appropriate for use. It includes any model incidents, with a proportional assessment of the root causes and the necessary controls to prevent the error from recurring (i.e., "Postmortem").
- The date and results of the most recent monitoring and any corrective actions.
- Model-use materiality summary.
- The latest date and extent to which materiality was assessed

- [Link to Model Monitoring Results Document](#)

10.2 Model Documentation

The key components of model documentation include:

1. Model Description, Intended Purpose, and Intended Use
2. Methodology and Assumptions
3. Data Choice and Use
4. Limitations and Risks
5. Validation and Sensitivity Analysis
6. Resource Repository (Key Definitions, Model Related Files, Key Contacts)
7. Vendor and Third-Party Models (relevant for models that are regularly updated)

10.2.1 Model Description, Intended Purpose, and Intended Use

- A description and overview of the model.
- Intended purpose and appropriate use. The model's objective, RBC component(s) it supports, and intended use boundaries.
- Model architecture. High-level structure (modules, sub-models), workflows, and computational methods.

10.2.2 Methodology and Assumptions

- Documenting key methodologies selected, through mathematical articulation, equations, and/or documenting pseudo-code to illustrate the methodology behind critical calculations.
- Documentation of key assumptions and justifications. Articulation and justification of key assumptions. If data and information are not representative of industry standards or if assumptions are made to adjust them, these factors should be properly tracked and documented so that users are aware of potential limitations. Documenting methodologies adopted for calibration and parameterization. Detail parameter choices, sources, calibration processes, and tuning decisions.
- Approximations and proxies: Document any key identification and methodologies for quantification (where possible) of any material simplifications or expert-judgment substitutions.
- Model-selection rationale. Document explanation of methodological or parameter-setting choices when alternatives exist.

10.2.3 Data Choice and Use

- Data choice. Document the rationale for the selected data and highlight any exclusions.
- Input specifications. Define the data elements, formats, frequency, and sources.
- Data lineage. Document change management and methodologies adopted, such as tracing data transformations from the original source to the final input, and the reconciliation checks conducted to ensure accuracy and the success of the data transformation.
- Quality Controls. Procedures for accuracy, completeness, reconciliation, and error handling.

10.2.4 Limitations and Risks

- Model limitations. Description of known constraints and conditions under which the model may be unreliable.
- Model risks. Documentation of known or potential misuses and the expected magnitude of impact, where quantifiable.

10.2.5 Validation and Sensitivity Analysis

- Performance assessment. Summary of validation activities, including documenting types of benchmarking, back-testing, and assessments of performance conducted. This may include documenting the selection and relevance of particular historical scenarios in such assessments.
- Stress and scenario test summaries. Documentation of test design, key results, and sensitivity of outcomes to major assumptions.

10.2.6 Resource Repository (Key Definitions, Model Related Files, Key Contacts)

- Glossary and acronyms. Define all specialized terms.
- File storage and naming conventions. Identification of storage locations for documentation, source code, and data files, with version control procedures.
- Contact information. Identify subject-matter experts for clarifications.

10.2.7 Vendor and Third-Party Models (relevant for models that are regularly updated)

1. External documentation.

- a. Attach or reference vendor manuals, model library documentation, or other technical papers describing methodologies, calibration processes, or validation procedures.
- b. Include or reference relevant training materials for users and maintainers.

2. Modeling platform and environment

- a. For models that require ongoing updates, specify hardware/software requirements, version numbers, and dependencies.
- b. Provide step-by-step guidance for executing the model.
- c. Where results are not expected to be fully reproducible (e.g., reliance on vended data that may be restated), explain why and describe how consistency is monitored.

3. Model and data updates

- a. Describe how and when input data are refreshed.
- b. Maintain change logs for methodology, code, or parameter updates.
- c. List expected outputs, units, and acceptable ranges.
- d. Document validation checks on outputs, including reconciliations to benchmarks, prior runs, or independent sources.

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