

CAPITAL ADEQUACY (E) TASK FORCE

Capital Adequacy (E) Task Force Nov. 17, 2021, Virtual Meeting *in lieu of meeting at the Fall National Meeting* Minutes
Capital Adequacy (E) Task Force, Sept. 30, 2021, E-vote Minutes (Attachment One)
2022 Proposed Charges (Attachment One-A)
Health Risk-Based Capital (E) Working Group Nov. 4, 2021, Minutes (Attachment Two)
Life Risk-Based Capital (E) Working Group Nov. 9, 2021, Minutes (Attachment Three)
Presentation of the Academy C-2 Mortality Work Group Recommendation (Attachment Three-A)
Full Report of the Academy C-2 Mortality Work Group Recommendation (Attachment Three-B)
Catastrophe Risk (E) Subgroup Oct. 27, 2021, Minutes (Attachment Four)
Catastrophe Risk (E) Subgroup Sept. 28, 2021, Minutes (Attachment Four-A)
Property and Casualty (E) Working Group Oct. 25, 2021, Minutes (Attachment Five)
RBC Action Level Analysis (Attachment Five-A)
2021-16 CR (2021 Catastrophe Event List) (Attachment Six)
Working Agenda (Attachment Seven)

Draft Pending Adoption

Draft: 11/18/21

Capital Adequacy (E) Task Force
Virtual Meeting (*in lieu of meeting at the 2021 Fall National Meeting*)
November 17, 2021

The Capital Adequacy (E) Task Force met Nov. 17, 2021. The following Task Force members participated: Judith L. French, Chair, represented by Tom Botsko (OH); Cassie Brown, Vice Chair, represented by Rachel Hemphill (TX); Lori K. Wing-Heier represented by David Phifer (AK); Jim L. Ridling represented by Charles Hale (AL); Ricardo Lara represented by Thomas Reedy (CA); Andrew N. Mais represented by Wanchin Chou (CT); David Altmaier represented by Carolyn Morgan and Ray Spudeck (FL); Doug Ommen represented by Mike Yanacheak (IA); Dana Popish Severinghaus represented by Kevin Fry (IL); Vicki Schmidt represented by Tish Becker (KS); Sharon P. Clark represented by Russell Coy (KY); Chlora Lindley-Myers represented by John Rehagen and William Leung (MO); Mike Causey represented by Jackie Obusek (NC); Eric Dunning represented Michael Muldoon (NE); Glen Mulready represented by Eli Snowbarger (OK); Raymond G. Farmer represented by Michael Shull (SC); Mike Kreidler represented by Steve Drutz (WA); and Mark Afable represented by Amy Malm (WI).

1. Adopted its Sept. 30 Minutes

The Task Force conducted an e-vote that ended Sept. 30 to adopt its 2022 proposed charges. No significant changes were made to the charges.

Mr. Drutz made a motion, seconded by Mr. Chou to adopt the Task Force's Sept. 30 minutes (Attachment One). The motion passed unanimously.

2. Adopted the Reports and Minutes of its Working Groups

a. Health Risk-Based Capital (E) Working Group

Mr. Drutz said the Health Risk-Based Capital (E) Working Group met Nov. 4 (Attachment Two) and took the following action: 1) exposed benchmark guidelines for Investment Income Adjustment for the Underwriting Risk Factors for a 30-day public comment period; and 2) discussed incorporating pandemic risk into the Health Risk-Based Capital (RBC) Formula.

b. Life Risk-Based Capital (E) Working Group

Mr. Botsko said the Life Risk-Based Capital (E) Working Group met Nov. 9 (Attachment Three) and took the following action: 1) exposed guidance on the bond factor changes for a 30-day public comment period; and 2) exposed the American Academy of Actuaries' (Academy's) C2 Mortality Risk Work Group recommendation on mortality factor updates for a 60-day public comment period.

c. Catastrophe Risk (E) Subgroup

Mr. Chou said the Catastrophe Risk (E) Subgroup met Oct. 27 (Attachment Four) and Sept. 28. During the Oct. 27 meeting, the Subgroup took the following action: 1) adopted its Sept. 28 minutes; 2) heard a presentation from Karen Clark & Company (KCC) regarding the KCC U.S. wildfire model, which included the current wildfire trends and an overview of the KCC U.S. wildfire model; 3) discussed the possibility of allowing additional third-party models or adjustments to the vendor models; and 4) heard updates from the Catastrophe Model Technical Review Ad Hoc Group.

d. Property and Casualty Risk-Based Capital (E) Working Group

Mr. Botsko said the Property and Casualty Risk-Based Capital (E) Working Group met Oct. 25 (Attachment Five) and took the following action: 1) adopted its July 22 minutes; 2) heard a report from the Catastrophe Risk (E) Subgroup; 3) exposed a draft recommendation to the Restructuring Mechanism (E) Subgroup for a 30-day public comment period ending Nov. 24. The draft recommendation was developed by the Working Group, which included the findings and recommendation of the runoff companies; 4) exposed proposal 2021-14-P (R3 Factor Adjustment) for a 30-day public comment period ending Nov. 24; and 5) heard an update on the status of the research on recommended adjustments to the formulas for premium and reserve risk to reflect the impact of interest rates from the Academy.

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Mr. Chou made a motion, seconded by Mr. Reedy, to adopt the minutes of its working groups and subgroup. The motion passed unanimously.

3. Adopted Proposal 2021-16-CR (2021 Catastrophe Event List)

Mr. Chou said the Catastrophe Risk (E) Subgroup and the Property and Casualty Risk-Based Capital (E) Working Group jointly conducted an e-vote that concluded Nov. 12 to adopt the 2021 (January through October) Catastrophe Event List. Both groups are planning to conduct another e-vote in January 2022 to adopt any November and December catastrophe events.

Mr. Chou made a motion, seconded by Mr. Reedy, to adopt proposal 2021-16 CR (2021 Catastrophe Event List) (Attachment Six). The motion passed unanimously.

4. Adopted its Working Agenda

Mr. Drutz said Item 19 was added to the Health RBC Working Agenda section to evaluate the underwriting risk factors for an adjustment of investment income based on a six-month U.S. Department of the Treasury (Treasury Department) bond on an annual basis. The second change was to Item 29 for bond evaluation, which was to change the priority status to a 3 and the expected completion date to year-end 2023 or later.

Mr. Drutz made a motion, seconded by Mr. Muldoon, to adopt its working agenda (Attachment Seven). The motion passed unanimously.

5. Discussed a Memorandum to the Financial Condition (E) Committee

Mr. Botsko said the Task Force has received numerous referrals over the past several years regarding investments that could potentially start being evaluated by the Securities Valuation Office (SVO) and reported with an NAIC designation in the investment schedules of the annual statement. The purpose of this new working group (RBC Investment Risk and Evaluation (E) Working Group) will be to evaluate the impact this could have, whether those changes are significant enough to change the current structure of the RBC formula, and whether the added granularity is beneficial to determine the appropriate capital standard. Mr. Botsko noted that an informal group was recently formed to discuss investment schedule reporting in the annual statement, and unlike the Investment Risk-Based Capital (E) Working Group that was recently disbanded, its focus was strictly with bond reporting and the RBC investment formula, and factors have been in place for 20 years, so a formal group is warranted to document its analysis for updates or justification of no changes to the factors and formula.

6. Heard a Presentation from RMS Regarding its North America Wildfire HD Model

Michael Young (Risk Management Solutions—RMS) provided a brief overview on its North America Wildfire High-Definition (HD) Model regarding: 1) the rationale for the development of its model; 2) key features and differentiators of the model; 3) factors influencing wildfire losses; and 4) the application of wildfire mitigation to insured property exposure. Mr. Chou encouraged all the interested parties to review this presentation and provide comments on the upcoming conference call.

Mr. Chou also stated that a Subgroup member met with the three wildfire modelers—i.e., AIR, KCC, and RMS—earlier to discuss the result of the impact analysis earlier. He said he believes that gaining a better understanding of the modeling results will enable the development of a better wildfire structure in the RBC formula. He said he expects that the initial RBC structure for wildfire will be ready for discussion in December. Thoughts and ideas on the structure are welcome at the upcoming meeting to complete this project effectively.

Having no further business, the Capital Adequacy (E) Task Force adjourned.

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Draft: 10/5/21

Capital Adequacy (E) Task Force
E-Vote
September 30, 2021

The Capital Adequacy (E) Task Force conducted an e-vote that concluded Sept. 30, 2021. The following Task Force members participated: Judith L. French, Chair, represented by Tom Botsko (OH); Cassie Brown, Vice Chair, represented by Mike Boerner (TX); Jim L. Ridling represented by Sheila Travis (AL); Ricardo Lara represented by Thomas Reedy (CA); Andrew N. Mais represented Kathy Belfi (CT); Karima M. Woods represented by Philip Barlow (DC); David Altmaier represented by Carolyn Morgan (FL); Dana Popish Severinghaus represented by Kevin Fry (IL); Vicki Schmidt represented by Tish Becker (KS); Sharon P. Clark represented by Russell Coy (KY); Chlora Lindley-Myers represented by John Rehagen (MO); Eric Dunning represented by Lindsay Crawford (NE); Mike Kreidler represented by Steve Drutz (WA); and Mark Afable represented by Amy Malm (WI).

1. Adopted its 2022 Proposed Charges

The Task Force conducted an e-vote to consider adoption of its 2022 proposed charges.

Mr. Mais made a motion, seconded by Mr. Rehagen, to adopt the Task Force's 2022 proposed charges (Attachment One-A). The motion passed unanimously.

Having no further business, the Capital Adequacy (E) Task Force adjourned.

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Draft: 8/17/21

Adopted by the Executive (EX) Committee and Plenary, Dec. xx, 2021

Adopted by the Financial Condition (E) Committee, Dec. xx, 2021

Adopted by the Capital Adequacy (E) Task Force, TBD

2022 Proposed Charges

CAPITAL ADEQUACY (E) TASK FORCE

The mission of the Capital Adequacy (E) Task Force is to evaluate and recommend appropriate refinements to capital requirements for all types of insurers.

Ongoing Support of NAIC Programs, Products or Services

1. The **Capital Adequacy (E) Task Force** will:
 - A. Evaluate emerging “risk” issues for referral to the risk-based capital (RBC) working groups/subgroups for certain issues involving more than one RBC formula. Monitor emerging and existing risks relative to their consistent or divergent treatment in the three RBC formulas.
 - B. Review and evaluate company submissions for the schedule and corresponding adjustment to total adjusted capital (TAC).
 - C. Evaluate relevant historical data and apply defined statistical safety levels over appropriate time horizons in developing recommendations for revisions to the current asset risk structure and factors in each of the RBC formulas.
2. The **Health Risk-Based Capital (E) Working Group, Life Risk-Based Capital (E) Working Group and Property and Casualty Risk-Based Capital (E) Working Group** will:
 - A. Evaluate refinements to the existing NAIC risk-based capital (RBC) formulas implemented in prior year. Forward the final version of the structure of the current year life and fraternal, property/casualty (P/C) and health RBC formulas to the Financial Condition (E) Committee by June.
 - B. Consider improvements and revisions to the various RBC blanks to: 1) conform the RBC blanks to changes made in other areas of the NAIC to promote uniformity; and 2) oversee the development of additional reporting formats within the existing RBC blanks as needs are identified. Any proposal that affects the RBC structure must be adopted no later than April 30 in the year of the change and adopted changes will be forwarded to the Financial Condition (E) Committee by the next scheduled meeting or conference call. Any adoptions made to the annual financial statement blanks or statutory accounting principles that affect an RBC change adopted by April 30 and results in an amended change may be considered by July 30 for those exceptions where the Capital Adequacy (E) Task Force votes to pursue by super-majority (two-thirds) consent of members present, no later than June 30 for the current reporting year.
 - C. Monitor changes in accounting and reporting requirements resulting from the adoption and continuing maintenance of the revised *Accounting Practices and Procedures Manual* (AP&P Manual) to ensure that model laws, publications, formulas, analysis tools, etc., supported by the Task Force continue to meet regulatory objectives.
 - D. Review the effectiveness of the NAIC’s RBC policies and procedures as they affect the accuracy, audit ability, timeliness of reporting access to RBC results and comparability between the RBC formulas. Report on data quality problems in the prior year RBC filings at the summer and fall national meetings.
3. The **Variable Annuities Capital and Reserve (E/A) Subgroup**, a joint subgroup of the Life Risk-Based Capital (E) Working Group and the Life Actuarial (A) Task Force, will:
 - A. Monitor the impact of the changes to the variable annuities reserve framework and risk-based capital (RBC) calculation and determine if additional revisions need to be made.
 - B. Develop and recommend appropriate changes including those to improve accuracy and clarity of variable annuity (VA) capital and reserve requirements.
4. The **Longevity Risk (E/A) Subgroup**, a joint subgroup of the Life Risk-Based Capital (E) Working Group and the Life Actuarial (A) Task Force, will:
 - A. Provide recommendations for the appropriate treatment of longevity risk transfers by the new longevity factors.
5. The **Catastrophe Risk (E) Subgroup** of the Property and Casualty Risk-Based Capital (E) Working Group will:
 - A. Recalculate the premium risk factors on an ex-catastrophe basis, if needed.
 - B. Continue to update the U.S. and non-U.S catastrophe event list.

- C. Continue to evaluate the need for exemption criteria for insurers with minimal risk.
- D. Evaluate the risk-based capital (RBC) results inclusive of a catastrophe risk charge.
- E. Refine instructions for the catastrophe risk charge.
- F. Continue to evaluate any necessary refinements to the catastrophe risk formula.
- G. Evaluate other catastrophe risks for possible inclusion in the charge.

NAIC Support Staff: Jane Barr

Draft: 11/5/21

Health Risk-Based Capital (E) Working Group
Virtual Meeting (*in lieu of meeting at the 2021 Fall National Meeting*)
November 4, 2021

The Health Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Nov. 4, 2021. The following Working Group members participated: Steve Drutz, Chair (WA); Jennifer Li (AL); Wanchin Chou (CT); Carolyn Morgan and Kyle Collins (FL); Michael Muldoon (NE); Tom Dudek (NY); Kimberly Rankin (PA); and Aaron Hodges (TX).

1. Exposed Proposal 2021-18-H

Mr. Drutz said the Working Group adopted adjusted underwriting factors to include investment income for year-end 2021; during these discussions, the Working Group agreed to develop benchmarking guidelines to review the adjustment based on the current market environment. These discussions ranged from a five-year holding period to coincide with the five-year time horizon used in the development of the bond factors to a shorter holding period, such as the six-month treasury due to companies not recognizing investment income in their rate filings with the states. A 0.5% investment yield was incorporated into the factors for year-end 2021. Mr. Drutz said the proposed language states that the benchmarking parameters would be based on a six-month Treasury bond as of Jan. 1 of each year.

Hearing no objections, the Working Group agreed to expose proposal 2021-18-H (Benchmarking Guidelines for Investment Income Adjustment in the Underwriting Risk Factors) for a 30-day public comment period ending Dec. 3.

2. Adopted its 2021 Revised Working Agenda

Mr. Drutz said the working agenda was revised to include an agenda item for reviewing the investment income adjustment on Jan. 1 of each year. The six-month Treasury bond was used as the basis since this is what was used in the 2021 adjustment. Mr. Drutz said further modifications or changes can be incorporated based on the final benchmarking guidelines adopted.

Mr. Drutz said an additional item that the Working Group may consider is related to the bond factors for the 20 designations; for year-end 2021, the health bond factors were adopted based on the American Academy of Actuaries (Academy) report and recommendations, while the life bond factors were adopted based on the Moody's Analytics report. He said the asset risk component is typically not a material component of the health risk-based capital (RBC) formula; therefore, he recommended revising Item 29 on the working agenda to a Priority 3, and he expects a completion date of year-end 2023 or later. He said this will allow the Working Group to further evaluate the differences between the two methodologies and gather at least one year of data to analyze the new factors and overall impact of the bonds on the health formula. Mr. Chou asked what the plan would be if the expected completion date is 2023 and when the Working Group would begin discussing this. Mr. Drutz said the Working Group would need to get through at least the middle of 2022 to get the data and then coordinate these discussions with the Property and Casualty Risk-Based Capital (E) Working Group. Mr. Chou agreed with this approach to move forward.

Mr. Chou made a motion, seconded by Mr. Dudek, to adopt the working agenda with the friendly amendment to revise Item 29 to a Priority 3 and an expected completion date of year-end 2023 or later. The motion passed unanimously.

3. Received an Update from the Academy on H2 – Underwriting Risk Component Review

Steve Guzski (Academy) said the Health Solvency Subcommittee of the Academy is operating on multiple workstreams and meeting continually over the last few months to review the H2 – Underwriting Risk component. He said the Subcommittee is on track to deliver its initial report to the Working Group by year-end. Crystal Brown (NAIC) asked if the Working Group plans to propose changes to the factors or structure. Mr. Guzski said he does not have that information at this time, but with the multiple workstreams, there is one group assessing the formula and another group assessing the new risk factor development. He said the Subcommittee plans to convene to determine if there are any proposed changes that would be included in the initial report.

4. Received an Update on the Excessive Growth Charge Ad Hoc Group and the Health Test Ad Hoc Group

Mr. Drutz said the Excessive Growth Charge Ad Hoc Group continued to meet and work on its analysis. He said the focus of the analysis has been to identify the factors that may be correlated and affected by excessive growth. The ad hoc group will continue its review and plans to meet later this month.

Mr. Drutz said the Health Test Ad Hoc Group met Nov. 3 and discussed the summary of the 2020 results and analysis. The ad hoc group discussed the continued inclusion of the reserve ratio in the test and whether that ratio should be adjusted. Mr. Drutz said a draft proposal has been developed and would remove the writing in five states or less and 75% of the writing in the domiciliary state requirements. The ad hoc group also discussed asset adequacy testing and the expectation of continuing to provide this in the actuarial opinion if a company were to move from the life blank to the health blank. The ad hoc group plans to meet again in early December.

5. Discussed Incorporating a Pandemic Risk Component into the Health RBC Formula

Mr. Drutz said the Working Group previously added a working agenda to consider the impact of pandemic risk and COVID-19 on the health RBC formula. The Working Group agreed to place a hold on reviewing this item until the world had moved further through the pandemic, as the full effects of the pandemic were not yet realized. Mr. Drutz asked the Working Group if it believes this item should remain on hold or if the Working Group should begin discussing it. The Working Group agreed to continue to table this discussion until next year.

Having no further business, the Health Risk-Based Capital (E) Working Group adjourned.

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Draft Pending Adoption

Attachment Three
Capital Adequacy (E) Task Force
11/17/21

Draft: 12/8/21

Life Risk-Based Capital (E) Working Group
Virtual Meeting (*in lieu of meeting at the 2021 Fall National Meeting*)
November 9, 2021

The Life Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Nov. 9, 2021. The following Working Group members participated: Philip Barlow, Chair (DC); Jennifer Li (AL); Ben Bock (CA); Wanchin Chou (CT); Sean Collins (FL); Carrie Mears (IA); Vincent Tsang (IL); Ben Slutsker (MN); William Leung (MO); Derek Wallman (NE); Seong-min Eom (NJ); Bill Carmello (NY); Andrew Schallhorn (OK); Mike Boerner and Rachel Hemphill (TX); and Tomasz Serbinowski (UT).

1. Adopted its Summer National Meeting minutes

Mr. Chou made a motion, seconded by Mr. Schallhorn, to adopt the Working Group's July 21 (*see NAIC Proceedings – Summer, Capital Adequacy (E) Task Force, Attachment Four*) minutes. The motion passed unanimously.

2. Exposed the Guidance Document on Bond Factor Changes

Mr. Barlow said this was directed to NAIC staff to draft in order to assist financial examiners and other state insurance regulators as they review the results of 2021 risk-based capital (RBC) calculations for life insurers in light of the 2021 bond factor changes. The Working Group exposed the guidance document for a 30-day public comment period ending Dec. 9.

3. Exposed the Report of the C2 Mortality Work Group of the Academy

Chris Trost (American Academy of Actuaries—Academy), chair of the Academy's C2 Mortality Work Group, said the last time the Work Group was able to provide a report was last year due to the focus on bonds, real estate, and longevity this year. He said the Work Group has continued its work and, where previous updates have been focused on methodology, the Work Group is now at a point to present its recommendations (Attachment Three-A). He noted that included with the recommendations is a full report (Attachment Three-B) that highlights the major changes in the proposed methodology along with detailed documentation on the methodology and assumptions. He said the Work Group is looking for additional feedback, questions, and any other information the Working Group would like to have provided.

Ryan Fleming (Academy) presented the recommendations. Discussing the overall framework and the mortality risk categories, he noted that while the previous recommendation included catastrophe risk, the Work Group has included two new components, one for a terrorism-type event as well as providing for some chance of a currently unknown event. Mr. Carmello asked about the work done for the original factors and suggested it was not stochastic. Mr. Fleming said it was a more limited number of potential scenarios related to various adverse events and did not involve running thousands of scenarios and getting a full distribution of results. Mr. Carmello said it appears these were more deterministic scenarios. Mr. Fleming highlighted what had changed in the recommendation from the original work and what had not as presented on slide six and noted that the expanded factor categories for both individual and group life are needed to reflect differences in mortality risk. He continued this aspect with the information in slides nine and 10, highlighting the relative contribution of the risk categories to the overall capital factors and noting that those factors should recognize that there are varying levels of flexibility to adjust premiums or mortality charges between the products.

The Working Group agreed to expose the Academy's recommendations and report for a public comment period ending Jan. 10, 2022. Mr. Barlow suggested scheduling a meeting to continue discussion of this recommendation during the exposure period and asked Mr. Trost to work with NAIC staff on drafting the actual blank and instructions necessary for a formal proposal.

4. Discussed Other Matters

Mr. Barlow reminded the Working Group that there is work being done by the American Council of Life Insurers (ACLI) on making the necessary modifications to the asset valuation reserve (AVR) factors related to the bond factor changes. He also

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noted that Dave Fleming (NAIC) has continued work on the statistics review and that the goal is to have this presented to those Working Group members who volunteered in December.

Having no further business, the Life Risk-Based Capital (E) Working Group adjourned.

[Att Three Life RBC 11-9-21 Minutes.docx](#)

Academy C-2 Mortality Work Group Recommendation

Chris Trost, MAAA, FSA
 Chairperson C-2 Mortality Work Group

Ryan Fleming, MAAA, FSA
 Vice Chair C-2 Mortality Work Group
 American Academy of Actuaries



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National Association of Insurance Commissioners (NAIC) Life Risk-Based Capital (E) Working
 Group (LRBCWG)—November 9, 2021

Agenda

- Review Life RBC C-2 mortality overall approach and current risk-based capital (RBC) factors
- Present recommendation on updated C-2 factors
 - Structural changes to factor categories
 - Updated factors under the recommended structure
- Appendix:
 - Methodology, assumption, and risk distribution comparisons
 - Validation, peer review, limitations

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Life RBC C-2 Mortality Overall Approach (1 of 2)

- Mortality risk is defined as adverse variance in life insurance deaths (i.e., insureds dying sooner than expected) over the remaining lifetime of a block of business while appropriately reflecting the pricing flexibility to adjust current mortality rates for emerging experience
- C-2 requirement covers mortality risk up to the 95th percentile covering adverse experience in excess of the amount covered in statutory reserves
- C-2 requirement includes mortality risks related to:
 - Volatility Risk—natural statistical deviations in experienced mortality
 - Level Risk—error in experience mortality assumption
 - Trend Risk—adverse mortality trend
 - Catastrophe Risks
 - Large temporary mortality increase from a severe event such as a pandemic or terrorism
 - Sustained mortality increase from an unknown risk



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Life RBC C-2 Mortality Overall Approach (2 of 2)

- Evaluate mortality risks using stochastic simulation of projected statutory losses
- Discount after-tax cash flows (at 2.765% after-tax discount rate [3.5% pre-tax])
- Express capital requirement using a factor-based approach applied to Net Amount at Risk (NAR) and convert to pre-tax



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C-2 Life Mortality Risk-Based Capital

Per \$1000 of NAR	Current Pre-Tax RBC Factors	
	Individual & Industrial Life	Group & Credit Life
First \$500M	2.23	1.75
Next \$4.5B	1.46	1.16
Next \$20B	1.17	0.87
>\$25B	0.87	0.78

- The C-2 component of RBC represents 17-18% of total life industry risk-based capital



5

What Changed and Didn't Change from the Original Work*

What Changed

- Expanded categories to three product categories for individual life and two categories for remaining rate terms for group life
- Addition of a catastrophe terrorism component
- Addition of a catastrophe unknown sustained risk component, replaces severe adverse HIV scenarios in original work
- Lower experience mortality rates
- Lower discount rates (2.765% after-tax versus 6% in original work)
- Inforce assumptions reflecting current U.S. life insurers (demographic, product, lapses, etc.) and group specific assumptions
- Mortality risk assumptions calibrated to latest research and studies
- New model developed in Excel VBA; stochastic capabilities are much greater today than the early 1990's

What Didn't Change

- Statistical safety level – 95th percentile over 5 years for individual life products with inforce pricing flexibility
- Capital is determined for losses in excess of reserve mortality – 5% margin in statutory reserve mortality is consistent with one standard deviation

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* See the Appendix for a detailed comparison of the current and original work



Pre-Tax C-2 Factor Recommendation versus Current RBC

Risk Component	Large Inforce Size >\$25B NAR	Small Inforce Size ≤\$500M NAR	Key Updates
HIV Scenarios	↓ 45%	↓ 25%	- Removal of discrete HIV scenarios
Level	↓ 25%	↑ 5%	- Lower experience mortality rates, reducing risk with large credible blocks
Trend	↑ 20%	↑ 10%	- Greater range of mortality trends and differences by age/sex cohort - Risk increases with longer exposure periods
Catastrophe	↑ 10%	↑ 5%	- Similar pandemic severity - Addition of 9/11-type terrorism event (+1%) - Addition of unknown sustained risk event (4-9%)
Capital Quantification Method	↑ 10%	↑ 5%	- Update to greatest present value of accumulated deficiencies (GPVAD) - Loss quantified as death benefits minus reserves released
Volatility	↑ 0%	↓ 5%	- Similar results as the original model
Length of Risk Exposure Period	↑ varies	↑ varies	- Factors increase based on the length of the current mortality rate risk exposure period - This is a critical variable for differentiating mortality risk



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Lower Experience Mortality Rates

- The new model uses a distribution of rating classes using 2017 CSO tables
- 2017 Commissioners Standard Ordinary (CSO) mortality rates are significantly lower (50%-90%) than "88% of the 1975-80 Basic Table" used previously due to decades of mortality improvement in the U.S.

- An example at a typical age highlights the significant decrease

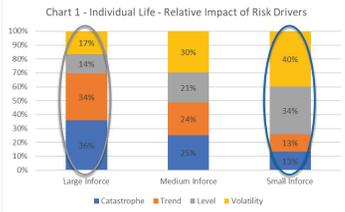
Comparison of Experience Mortality Rates, Example	
Rates Per 1,000	
Age 45, Male	
Table	Duration 1
88% of 1975-80 Basic Table	1.08
2017 CSO Unloaded Composite	0.48
% Difference	-56%

- Similar % decreases also occur at different gender, ages and underwriting classes
- Experience mortality manifests through the level risk component

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C-2 Factor Attribution by Mortality Risk Individual Life - 5-Year Projection Period Example

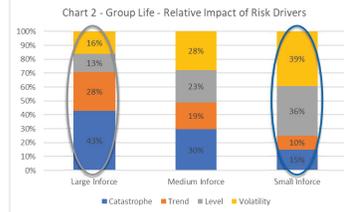


- Risks for large inforce blocks are spread proportionately between volatility/level, trend, and catastrophe
- Smaller inforce blocks are subject to higher volatility and level risks, which results in higher factors versus larger blocks



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C-2 Factor Attribution by Mortality Risk Group Life - 5-Year Projection Period Example



- Risks for large inforce blocks are spread proportionately between volatility/level, trend, and catastrophe
- Smaller inforce blocks are subject to higher volatility and level risks, which results in higher factors versus larger blocks



10

Expanded Categories to Three Products for Individual Life and Two Categories for Remaining Rate Terms for Group Life

Original 1990s Work

- 1993 factors used a 5-year risk exposure period for all individual life business and a 3-year risk exposure period for group life because it assumed that management actions would occur to reset current mortality rates to reflect emerging experience



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Expanded Categories to Three Products for Individual Life and Two Categories for Remaining Rate Terms for Group Life

Current Work

- For individual life, management action to reset current mortality rates may be limited or non-existent for products that offer longer term mortality rate guarantees (e.g., Universal Life with Secondary Guarantees (ULSG), Level Term)
- For group life, there are varying lengths of premium rate terms in the marketplace
- Factors aligned with the remaining risk exposure period of current mortality rates on an inforce block is appropriate. This risk differentiation can be accomplished by varying factors by product for individual life and by remaining premium term for group life.
- The recommendation is to expand factors into additional categories to reflect the current mortality rate risk exposure period over the remaining lifetime of an inforce block of business
 - For individual life insurance, the recommendation is to differentiate into three product categories with definitions consistent with the annual statement – analysis of operations by line of business – individual life insurance and VM-20
 - For group life insurance, the recommendation is to differentiate into two categories by remaining length of the rate term based on company records by group contract



12

Two New Catastrophe Components

- A terrorism component was developed based on industry experience from the September 11, 2001 terrorist attacks
 - Component assumes a 5% annual probability of an extra 0.05 deaths per 1,000.
- As shared at the [September 11, 2020 LRBCWG meeting](#), a new catastrophe component was developed for a sustained mortality increase from an unknown risk, which serves as a replacement for the adverse HIV scenarios in the original work
 - Component is intended to cover unknown risks that could materialize in the insured population
 - The component assumes a 2.5% annual probability of a 5% sustained severe mortality increase
 - In follow up to a question at the 9/11/20 meeting, sensitivity testing was performed at a 5% annual probability, which has a very modest impact (within rounding to the nearest 0.05)
 - If the event occurs, it is sustained for the remainder of the projection period up to a maximum period of 10 years
 - Without this component the recommended factors would be about 0.1 lower
- **The recommendation is to include these two new catastrophe components.**



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Recommended Updated C-2 Factors

Per \$1000 of NAR	Pre-Tax Life RBC C-2 Factors				
	Individual & Industrial Life			Group & Credit Life	
	Universal Life with Secondary Guarantees	Term Life	All Other Life	Remaining Rate Terms Over 3 Years	Remaining Rate Terms 3 Years and Under
First \$500M (Small)	3.90	2.70	1.90	1.80	1.30
Next \$24.5B (Medium)	1.65	1.10	0.75	0.70	0.45
>\$25B (Large)	1.10	0.75	0.50	0.45	0.30

- Individual Life:** New categorization would be determined based on the categories specified in the annual statement analysis of operations by line of business and consistent with VM-20
- ULSG: factors are the highest due to the longest current mortality rate guarantees and are based on a 20-year risk exposure period for a mature inforce block
 - Term Life: factors are based on a typical 10-year risk exposure period for a mature inforce block. The industry is concentrated in 10, 20 and 30-year level term.
 - All Other Life: factors are based on a 5-year risk exposure period and assume inforce pricing may be adjusted following adverse mortality experience due to the presence of non-guaranteed elements. Examples are universal life products without secondary guarantees and participating whole life products.
- Group Life:** New categorization would be determined based on company records for the remaining premium rate terms by group contract
- One category is for remaining premium rate terms greater than 3 years and is represented by a 5-year exposure period
 - The other category is remaining premium rate terms 3 years and under and is represented by a 3-year exposure period



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Recommendation on Updated C-2 Factors

Per \$1000 of NAR	Pre-Tax Life RBC C-2 Factors						
	Individual & Industrial Life				Group & Credit Life		
	Universal Life with Secondary Guarantee	Term Life	All Other Life	% of Individual Life Insurers*	Remaining Rate Terms Over 3 Years	Remaining Rate Terms 3 Years and Under	% of Group Life Insurers*
First \$500M (Small)	3.90	2.70	1.90	43%	1.80	1.30	54%
Next \$24.5B (Medium)	1.65	1.10	0.75	36%	0.70	0.45	33%
>\$25B (Large)	1.10	0.75	0.50	21%	0.45	0.30	12%

- Size bands were reviewed, and **the recommendation is to combine the current middle two categories (\$500M-\$5B and \$5B-\$25B) into one category (\$500M-\$25B)**
- **The recommendation is to continue categorizing industrial life with individual life and credit life with group life**
- **The recommendation is to continue with the 50% credit given for group premium stabilization reserves**

* As of 2019 annual statement reporting



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Recommendation vs Current RBC Individual & Industrial Life Impacts

Per \$1000 of NAR	Pre-Tax Life RBC C-2 Factors						
	Individual & Industrial Life				Change vs Current RBC		
	Current RBC	ULSG	Term	All Other	ULSG	Term	All Other
First \$500M	2.23	3.90	2.70	1.90	+75%	+21%	-15%
Next \$4.5B	1.46	1.65	1.10	0.75	+13%	-25%	-49%
Next \$20B	1.17	1.65	1.10	0.75	+41%	-6%	-36%
>\$25B	0.87	1.10	0.75	0.50	+26%	-14%	-43%

- Overall individual life industry impact would be a modest decrease with industry exposure by NAR concentrated in Term business amongst large insurers
- Factors increase for ULSG
- Factors decrease for products with inforce pricing flexibility (i.e., All Other category)
- Small ULSG and Term carriers would experience an increase on retained business; however, reinsurance is typically used to transfer/mitigate the mortality risk



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Recommendation vs Current RBC Group & Credit Life Impacts

Per \$1000 of NAR	Pre-Tax Life RBC C-2 Factors				
	Group & Credit Life			Change vs Current RBC	
	Current RBC	Remaining Rate Terms Over 3 Years	Remaining Rate Terms 3 Years and Under	Remaining Rate Terms Over 3 Years	Remaining Rate Terms 3 Years and Under
First \$500M	1.75	1.80	1.30	+3%	-26%
Next \$4.5B	1.16	0.70	0.45	-40%	-61%
Next \$20B	0.87			-20%	-48%
>\$25B	0.76	0.45	0.30	-41%	-61%

- Overall group industry impact would be a significant decrease in C-2 capital
- Factors decrease for all but one category: small size for longer rate terms which stays about the same
- Group life factors decreased due to the decades-long decline in experience mortality rates, and the exposure periods remain shorter term as compared to individual life
- C-2 is reduced by up to 50% of premium stabilization reserves



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C-2 Factors as an Overall Mortality Increase and Observations Versus Other Capital Regimes

Inforce Block Size	Overall Mortality Increase	
	Individual & Industrial Life – 5-year	Group & Credit Life – 5-year
Small	+22%	+31%
Medium	+10%	+14%
Large	+8%	+10%

- Table translates factors to an overall mortality percentage increase for a 5-year risk exposure period
- Percentage increases are similar for other risk exposure periods with cumulative magnitudes being greater for longer periods
 - For example, a 10% increase for 10 years is more severe than a 10% increase for 5 years
- Factors were reviewed against other capital regimes, including Canada, International Capital Standards (ICS), Solvency II and rating agency
 - Mortality risk drivers are consistent
 - Confirmed magnitudes are reasonable for the 95th percentile



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Sensitivity Testing: Other Attributes that Increase Mortality Risk

- The model was extensively sensitivity tested, and the following attributes increase mortality risk for companies concentrated in these areas
- The C-2 Mortality Work Group doesn't recommend differentiating RBC factors by these attributes; however, they may be useful to regulators when reviewing potentially weakly capitalized companies
- Older Attained Ages:** capital needs per unit of net amount at risk increase for attained ages 65 and older due to increasing mortality rates
- Substandard/Classified Underwriting Classes:** capital needs are higher due to higher mortality rates on unhealthy/riskier lives



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Summary of Recommendations

- The Academy C-2 Life Mortality Work Group recommends the factors shown on [Slide 14](#) which reflect
 - Expanding factors into additional categories to reflect the current mortality rate risk exposure period over the remaining lifetime of an inforce block of business
 - For individual life insurance, the recommendation is to differentiate into three product categories with definitions consistent with the annual statement – analysis of operations by line of business – individual life insurance and VM-20
 - For group life insurance, the recommendation is to differentiate into two categories by the remaining length of the premium term based on company records by group contract
 - Including the two new catastrophe components for 1) terrorism (expressed as a 5% annual probability of an extra 0.05 deaths per 1,000) and 2) the risk of a sustained mortality increase from an unknown event (expressed as a 2.5% annual probability of a 5% sustained mortality increase)
 - Combining the current middle two size categories into one category
 - Continue categorizing industrial life with individual life and credit life with group life
 - Continue with the 50% credit given for group life premium stabilization reserves
- The work group opines that additional review of the adopted correlation factor with longevity C-2 is not necessary as the Life C-2 modeling was completed consistently with longevity



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Proposed Timeline

- A proposed timeline for a year-end 2022 implementation
 - By end of Q4 2021: expose recommended final factors
 - By end of Q1 2022: structural changes are adopted
 - By end of Q2 2022: updated factors are adopted
 - Year-end 2022: factors are implemented for year-end 2022 annual statements



Questions?

Additional Questions, contact:

Khloe Greenwood, Life Policy Analyst
 greenwood@actuary.org

Chris Trost, Chairperson C-2 Mortality Work Group

Ryan Fleming, Vice Chair C-2 Mortality Work Group



Appendix: Method and Assumption Comparison

Item	Original Work	Recommendation
General Method	Monte Carlo Model – Present Value (PV) of Death Benefits	Monte Carlo Model – PV of Statutory Losses • Loss defined as death benefits minus reserves released
Capital Quantification	PV(95%) – 105%*PV(Expected) • 5% margin/load assumed in reserve mortality	GPVAD(95%) • Greatest present value of accumulated deficiencies (GPVAD) • 5% margin/load assumed in reserve mortality
Length of Exposure Period	5 years (3 years for Group) • Assumed exposure past 5 years could be offset through management actions (raise premium, adjust non-guaranteed elements, etc.)	5, 10, and 20 years for Individual Life 3 and 5 years for Group Life
Discount rate	6% after-tax	2.765% after-tax (3.5% pre-tax)
Experience Mortality	88% of 1975-1980 Male Basic Table • 15Y Select & Ultimate Structure • Male/Female not explicitly modelled • Underwriting adjustments applied based on generation	2017 Unloaded Commissioners' Standard Ordinary Table (CSO) for Individual Life • 25Y Select & Ultimate structure • Gender distinct – Male/Female • 5 underwriting classes (3 non-smoker/2 smoker) SDA 2016 Group Life Experience Study for Group Life • Gender distinct – Male/Female
Mortality Improvement	Unknown source • 1.00%	2017 Improvement Scale for VM-20 • Varies by gender and age



Appendix: Risk Distribution Approach Comparison

Risk	Original Work	Recommendation
Volatility	Binomial(Policies, q)	Binomial(Policies, q)
Level	Implicit from Discrete Scenarios: • 7 Competitive Pressures scenarios – risk of overoptimistic pricing assumptions • 15 AIDS scenarios – early 90's estimates of the impact of AIDS on insured mortality (could fit in level, trend, or catastrophe)	$LR \sim N(0, \sigma_{LR})$; $\sigma_{LR} = \sqrt{\sigma_{CRA}^2 + \sigma_{MFD}^2}$ • Two independent components: • Credibility/statistical sampling volatility (σ_{CRA}) • True mortality volatility (σ_{MFD}) • Continuous normal distribution
Trend	Discrete Distribution • 7 scenarios adjust mortality improvement assumption	$[M_{1j}, M_{1j}, \dots, M_{1j}] \sim N(\mu, \Sigma)$ • 6 gender/age group improvement variables (M_{1j}) • Correlated normally distributed random variables
Catastrophe	Discrete Distribution • Pandemic	3 Discrete Distributions • Pandemic – calibrated from multiple sources • Terrorism – 5% probability of additional 0.05 / 1X • Unknown Risk – 2.5% probability of a sustained 5% increase



Appendix: Model Validation, Peer Review, Limitations

- **Validation:** Model assumptions were developed by the work group through reviewing current mortality research and studies applicable to the U.S. life insurance industry. The assumptions were discussed, reviewed and agreed upon through the work group's bi-weekly calls. Model results and sensitivities were also reviewed extensively by the work group. The work group also provided several updates to the NAIC Life Risk-Based Capital Working Group throughout the project and feedback was obtained from regulators.
- **Peer Review:** The model was independently peer reviewed by a member of the work group. The peer review confirmed that the calculations performed by the model were reasonable for the intended purpose and were being applied as intended.
- **Limitations:** The model is intended to stochastically project through Monte Carlo simulation the run-off of inforce life insurance blocks typical of U.S. life insurers in order to develop capital factors for use in the NAIC RBC formula for C-2 life insurance mortality risk. Other uses outside of this intended purpose may not be appropriate. Product features in the model were developed at a very basic level and consider differences in base statutory reserves, lapses, post level term mortality experience, face amounts and attained ages. The model is not designed to replicate detailed product and inforce block characteristics unique to individual companies. In particular, ULSG products were not directly modeled. The work group concluded based on the modeling that the capital factors are insensitive to product differences for a given risk exposure period. The recommendation to differentiate based on product is an indirect way to get at the length of mortality rate guarantee, utilizes the current reporting structure of the annual statements, and is aligned with principles based reserving differentiation.

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Appendix: Prior Work Group Presentations to Life RBC

- [September 2020](#)
- [December 2019](#)
- [June 2019](#)
- [April 2019](#)
- [August 2018](#)
- [August 2017](#)

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November 9, 2021

Mr. Philip Barlow
Chair, Life Risk-Based Capital (E) Working Group
National Association of Insurance Commissioners (NAIC)

Dear Philip,

On behalf of the C-2 Mortality Work Group of the American Academy of Actuaries¹, we are providing a recommendation on updates to the Life Risk-Based Capital (RBC) C-2 Mortality Factors. The objective of the work group was to review and update the model developed in the early 1990's, which was used in setting the currently applicable Life RBC C-2 factors.

The recommendation may be found in the attached report and accompanying slide presentation. The recommended factors are based on the following key changes.

1. Expanding factors into additional categories to reflect the assumed current mortality rate risk exposure period over the remaining lifetime of an inforce block of business.
2. Adding two catastrophe components for a) terrorism (expressed as a 5% annual probability of an extra 0.05 deaths per 1,000), and b) the risk of a sustained mortality increase from an unknown event (expressed as a 2.5% annual probability of a 5% sustained mortality increase). These two new components are in addition to the pandemic component previously included.
3. Combining the current middle two size categories into one category.

The remainder of the structure is recommended to stay the same. We look forward to presenting the work group's recommendation at the November 9, 2021 Life Risk-Based Capital (E) Working Group meeting.

Sincerely,

Chris Trost, MAAA, FSA
Chairperson, C-2 Mortality Work Group
American Academy of Actuaries

Ryan Fleming, MAAA, FSA
Vice Chair, C-2 Mortality Work Group
American Academy of Actuaries

¹ The American Academy of Actuaries is a 19,500-member professional association whose mission is to serve the public and the U.S. actuarial profession. For more than 50 years, the Academy has assisted public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

Life RBC – C-2 Mortality Risk

Model Documentation Report of the American Academy of Actuaries C-2
Mortality Work Group

to the National Association of Insurance Commissioners (NAIC)
Life Risk-Based Capital (E) Working Group

November 9, 2021

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Executive Summary

Introduction

The purpose of this report is to document the model developed and used by the Academy C-2 Life Mortality Work Group in support of its work to consider and propose updates to the C-2 capital factors for life insurance mortality within the NAIC Risk-Based Capital formula. The objective of the work group was to review and update the model developed in the early 1990's, which was used in setting the Life RBC C-2 factors which have been in place since 1993.

Mortality risk is defined as adverse variance in life insurance deaths (i.e., insureds dying sooner than expected) over the remaining lifetime of a block of business while appropriately reflecting the pricing flexibility to adjust current mortality rates for emerging experience. Life insurance mortality risk was evaluated by stochastic simulation through the model documented in this memo. The mortality risks evaluated were volatility, level, trend, and catastrophe. The model is intended to simulate the run-off of inforce life insurance blocks typical of U.S. life insurers.

The capital need, expressed as a dollar amount, is determined as the greatest present value of accumulated deficiencies at the 95th percentile of the stochastic distribution of scenarios over the remaining lifetime of a block of business while appropriately reflecting the pricing flexibility to adjust current mortality rates. Statutory losses are defined as the after-tax quantification of gross death benefits minus reserves released minus mortality margin present in reserves. The after-tax statutory losses are discounted to the present by using 20-year averages for U.S. swap rates. By selecting the largest present value accumulated loss across all projection years, the solved for capital ensures survival at all projection periods. Earlier period losses are not allowed to be offset by later period gains to reduce capital. The 95th percentile is the commonly accepted statistical safety level used for Life RBC C-2 mortality risk to identify weakly capitalized companies. The after-tax capital needs are translated to a factor expressed as a percentage of the initial net amount at risk (NAR), and are shown as an amount per \$1,000 of NAR. The pre-tax factor is determined by taking the after-tax factor divided by (1 minus the tax rate).

The documentation includes descriptions of model inputs and assumptions, capital quantification method, results and sensitivities, validation and peer review and limitations.

Key Assumption Changes from Original Work

The following assumptions changes from the original work are highlighted as having the most significant impact on the modeled results.

1. Experience mortality rates are significantly lower than when the original work was completed, reflecting decades of U.S. insured population mortality improvement. This leads to lower capital need through the level risk component for large inforce blocks with credible mortality experience.
2. In place of the severe human immunodeficiency virus (HIV) scenarios assumed in the original work, a new catastrophe risk component was developed for an unknown sustained increase in mortality. The net impact of these two changes was a reduction in the capital need as the higher probability, higher severity HIV assumptions were replaced with the unknown risk component that has lower probability and severity.

3. The pandemic distribution was updated, and a terrorism component was added, leading to a modest increase in the capital need.
4. Trend risk was expanded to reflect a greater range of mortality trends and differences by age/gender cohorts. This update resulted in higher capital factors.
5. The capital quantification method was updated to a greatest present value of accumulated deficiencies (GPVAD) method with statutory losses defined as death benefits minus reserves released. This resulted in a modest increase compared to the prior method.
6. The risk exposure period to current mortality rates was expanded to reflect product and premium terms available in the marketplace. For individual life, the risk exposure periods were expanded from 5 years to 5 years, 10 years, and 20 years. For group life, the risk exposure periods were expanded from 3 years to 3 years and 5 years. The longer a company is exposed to current mortality rates without being able to adjust pricing, the greater the capital need.

The directional impact relative to the current RBC factors for large and small inforce block sizes is highlighted in Exhibit 1 below. For a 5-year risk exposure period, the overall impact of the model updates results in a significant decrease in most factors. However, the risk exposure period is a critical variable, and this component factors into the structural changes being recommended by this work group.

Exhibit 1		
Risk Component	Large Inforce Size >\$25B NAR	Small Inforce Size ≤\$500M NAR
HIV Scenarios	↓ 45%	↓ 25%
Level	↓ 25%	↑ 5%
Trend	↑ 20%	↑ 10%
Catastrophe	↑ 10%	↑ 5%
Capital Quantification Method	↑ 10%	↑ 5%
Volatility	↑ 0%	↓ 5%
Length of Risk Exposure Period	↑ varies	↑ varies

Overall Results and Recommended C-2 Factors

The recommended pre-tax factors per \$1,000 of retained NAR are shown in Table 1 below. Business assumed by reinsurers is treated as direct for reinsurer financial statements. The factors are differentiated by individual & industrial life and group & credit life, consistent with the current framework. The modeling focused on individual and group life, and the work group evaluated the continued appropriateness of applying the factors to industrial life and credit life business. It is recommended that industrial life and credit life continue to be mapped to individual and group life, respectively, as the product attributes are similar. The factors are rounded to the nearest 0.05 to recognize the randomness inherent in the model (see Impact of Random Number Seed for additional information). Three size bands are recommended to represent inforce blocks of small, medium, and large sizes. This reflects combining the two middle

categories of the current framework as the risk characteristics are similar. The size bands were reviewed and continue to be relevant and appropriate, and a material portion of life insurers are represented within each category.

Within individual & industrial life, the factors are differentiated into three product categories: Universal life with secondary guarantees (ULSG), term life, and all other life. The product definitions are consistent with the annual statement – analysis of operations by line of business – individual life insurance and Valuation Manual (VM)-20. The differences by product category are the sole result of applying different risk exposure periods to an aggregate life inforce block. As described in Sensitivity 4 Individual Life Products under Model Sensitivities, the model produces consistent results by product for a given risk exposure period, as expressing the factor as a percentage of net amount at risk neutralizes product differences.

ULSG factors are the highest due to the longest current mortality rate exposure and are based on a 20-year risk exposure period for a mature inforce block. Term life factors are based on a typical 10-year risk exposure period for a mature inforce block. The industry is concentrated in 10-, 20- and 30-year level term. All other life factors are based on a 5-year risk exposure period and assume inforce pricing may be adjusted following adverse mortality experience due to the presence of non-guaranteed elements. Examples are universal life (UL) products without secondary guarantees and participating whole life products.

Within group & credit life, the factors are differentiated into two categories based on the remaining length of the premium term based on company records by group contract. The two categories are remaining rate terms over 3 years and remaining rate terms 3 years and under. The remaining rate terms over 3 years category is represented by a 5-year risk exposure period, and the remaining rate terms 3 years and under is represented by a 3-year risk exposure period. The risk exposure periods recognize a time lag between when experience emerges and when pricing is adjusted.

<i>Pre-Tax RBC C-2 Factors</i>	Individual & Industrial Life				Group & Credit Life		
	Universal Life with Secondary Guarantee (ULSG)	Term Life	All Other Life	% of Individual Life Insurers*	Remaining Rate Terms Over 3 Years	Remaining Rate Terms 3 Years and Under	% of Group Life Insurers*
<i>Per \$1,000 of Inforce NAR</i>							
First \$500M	3.90	2.70	1.90	43%	1.80	1.30	54%
Next \$24.5B	1.65	1.10	0.75	36%	0.70	0.45	33%
> \$25B	1.10	0.75	0.50	21%	0.45	0.30	12%

* as of 2019 annual statement reporting

Table 2 and Table 3 compare the recommended factors versus the current RBC factors in place as of 12/31/2020.

<i>Pre-Tax RBC C-2 Factors</i>	Individual & Industrial Life				Change vs Current RBC		
	Current RBC	ULSG	Term	All Other	ULSG	Term	All Other
<i>Per \$1,000 of Inforce NAR</i>							
First \$500M	2.23	3.90	2.70	1.90	75%	21%	-15%
Next \$4.5B	1.46	1.65	1.10	0.75	13%	-25%	-49%
Next \$20B	1.17	1.65	1.10	0.75	41%	-6%	-36%
> \$25B	0.87	1.10	0.75	0.50	26%	-14%	-43%

The overall individual life industry impact would be a modest decrease with industry exposure by NAR concentrated in term life business amongst large insurers. Factors increase for ULSG due to the long-term

exposure period to current mortality rates. As indicated in Exhibit 1, factors decrease for products with near-term inforce pricing flexibility (i.e., all other category). Small ULSG and term carriers would experience an increase on retained business. However, reinsurance is often used to transfer/mitigate the mortality risk for small carriers.

<i>Pre-Tax RBC C-2 Factors</i>	Group & Credit Life				
	Remaining Rate			Change vs Current RBC	
	Remaining Rate	Remaining Rate	Remaining Rate	Remaining Rate	Remaining Rate
<i>Per \$1,000 of Inforce NAR</i>	Current RBC	Terms Over 3 Years	Terms 3 Years and Under	Terms Over 3 Years	Terms 3 Years and Under
First \$500M	1.75	1.80	1.30	3%	-26%
Next \$4.5B	1.16	0.70	0.45	-40%	-61%
Next \$20B	0.87	0.70	0.45	-20%	-48%
> \$25B	0.76	0.45	0.30	-41%	-61%

The overall group industry impact would be a significant decrease in C-2 capital. The factors decrease for all but one category: small size for longer rate terms which stays about the same. Group life factors decreased due to the decades-long decline in experience mortality rates, and the risk exposure periods remain shorter term as compared to individual life.

Credit for Group Life Premium Stabilization Reserves

The current RBC formula includes a 50% credit for group life premium stabilization reserves to offset the group life C-2 requirement. This component was reviewed by the work group. Based on a theoretical framework and professional experience, the 50% factor was deemed to be an appropriate offset to the capital requirement.

Correlation with Longevity C-2

The updated Life C-2 mortality modeling was completed consistent with the development of the adopted Longevity C-2 factors and correlation factor. Therefore, the work group opines that additional review of the adopted correlation factor is not necessary because of the updates to the Life C-2 mortality factors being recommended by this work group.

Introduction

The purpose of this report is to document the model developed and used by the Academy C-2 Life Mortality Work Group in support of its work to consider and propose updates to the C-2 capital factors for life insurance mortality within the NAIC Life Risk-Based Capital formula. The objective of the work group was to review and update the model developed in the early 1990's, which was used in setting the Life RBC C-2 factors which have been in place since 1993.

Mortality risk is defined as adverse variance in life insurance deaths (i.e., insureds dying sooner than expected) over the remaining lifetime of a block of business while appropriately reflecting the pricing flexibility to adjust current mortality rates for emerging experience. Life insurance mortality risk was evaluated by stochastic simulation through the model documented in this memo. The mortality risks evaluated were volatility, level, trend, and catastrophe. The model is intended to simulate the run-off of inforce life insurance blocks typical of U.S. life insurers.

The capital need, expressed as a dollar amount, is determined as the GPVAD at the 95th percentile of the stochastic distribution of scenarios over the remaining lifetime of a block of business while appropriately reflecting the pricing flexibility to adjust current mortality rates. Statutory losses are defined as the after-tax quantification of gross death benefits minus reserves released minus mortality margin present in reserves. The after-tax statutory losses are discounted to the present by using 20-year averages for U.S. swap rates. By selecting the largest present value accumulated loss across all projection years, the solved for capital ensures survival at all projection periods. Earlier period losses are not allowed to be offset by later period gains to reduce capital. The 95th percentile is the commonly accepted statistical safety level used for Life RBC C-2 mortality risk to identify weakly capitalized companies. The after-tax capital needs are translated to a factor expressed as a percentage of the initial NAR, and are shown as amount per \$1,000 of NAR. The pre-tax factor is determined by taking the after-tax factor divided by (1 minus the tax rate).

The documentation includes descriptions of model inputs and assumptions, capital quantification method, results and sensitivities, validation and peer review and limitations.

Inputs and Assumptions

This section describes the inputs and assumptions used by the model. Detail on specific assumptions is available upon request.

Model Assumptions

The model assumptions section are high-level parameters for running the model and include the following inputs.

- **Random Number Seed:** This is the random number seed for starting the sequence of numbers for the random number generator. This was randomly set to 25 for the modeling. This assumption is necessary in order to be able to exactly re-produce model results. Changing the random number seed will result in a different sequence of random numbers and changes to model results (See sensitivities).
- **Scenarios:** This is a number of scenarios the model runs. 10,000 scenarios were assumed to obtain a smooth and full distribution of results.
- **Projection Years:** This is a number of years the model will run for each scenario. The model is set up to run from 1-30 years. The projection period represents the risk exposure period for an inforce block where current mortality rates are at risk for adverse experience. 3-year and 5-year projection periods were selected for group life insurance to cover the typical remaining periods for rate terms for group products and the ability to re-price for mortality changes after this period. This was a change from the 3-year period assumed in the prior work. Individual life insurance was selected to run for projection periods of 5 years, 10 years, and 20 years. The 5-year period is intended to represent inforce blocks where pricing may be adjusted following adverse mortality experience due to the presence of non-guaranteed elements, which are not yet being charged at maximum levels. Longer projection periods are intended to represent inforce blocks that have little to no flexibility to respond to mortality changes over the remaining lifetime. ULSG factors are based on a 20-year risk exposure period for a mature inforce block. Term life factors are based on a typical 10-year risk exposure period for a mature inforce block. The industry is concentrated in 10-, 20- and 30-year level term.

- **Policies:** This is the assumed number of policies in a life insurer’s inforce block. Three size bands were modeled: 1,000,000 policies for large inforce blocks, 100,000 policies for medium inforce blocks, and 10,000 policies for small inforce blocks. Policy size weightings are applied by face amount subject to the retention limits.
- **Discount Rate (Pre-Tax):** Projected amounts are discounted to the present using this assumption converted to an after-tax rate. A 3.5% discount rate was selected based on the 2001-2020 average of 10-year U.S. swap rates. The selection of the discount rates is aligned with the same methodology used to determine the discount rate for the RBC C-1 bond factors. The methodology uses a 20-year average and is intended to represent a risk-free rate.
- **Retention Limit:** This represents the maximum retained face amount per policy for a company’s inforce block. Amounts above this limit are assumed to be reinsured (or not issued above the limit). Three retention limits were modeled based on company size: \$1,000,000 for large inforce blocks, \$250,000 for medium inforce blocks, and \$50,000 for small inforce blocks. These assumptions are used to calibrate the total inforce block size for the three size categories. Results are insensitive to variations in retained face amount for a given number of policies (see Sensitivity 8 Face Amount under Model Sensitivities).
- **Tax Rate:** This represents the tax rate applied to pre-tax statutory losses to determine after-tax losses. The rate of 21% is based on the current U.S. corporate tax rate. It is also used to convert the discount rate to an after-tax rate.

Initial Inforce Assumptions

These set of assumptions are used to specify parameters for inforce weightings that is used to develop a block of inforce policies. Given the weights input in this section, the “Initial Inforce Loaded in Model” section is weighted to specify the inforce cohorts and policy counts run through the model processing. Based on the characteristics outlined, the inforce population may have up to 8,748 unique cohorts. The weightings assumed for the modeling analysis were developed using data from the two experience reports in the table below. The model has the ability to run individual and group life together, but the analysis was done modeling these separately to determine unique factors for each category.

Individual Life	Society of Actuaries (SOA) 2009-2013 Individual Life Insurance Mortality Experience Report
Group Life	Society of Actuaries 2016 Group Life Experience Committee Report

- **Gender:** The overall percentages of males and females for individual and group life.
- **Underwriting Code:** The underwriting codes and rating class weightings for the inforce population. The underwriting code for a given cohort is used to map to a mortality based on that underwriting class. There are 5 underwriting codes/classes for individual life aligned with the categories for the 2017 Commissioners Standard Ordinary (CSO) mortality table: non-smoker best class (super preferred), non-smoker mid class (preferred), non-smoker residual (standard), smoker best class (preferred), and smoker residual (standard). Group life policies are not assumed to be underwritten and are mapped to mortality developed from the SOA 2016 group life experience study.

- **Product Code:** The product weightings for the inforce population. There are four individual life products simulated: 10-year level term, 20-year level term, permanent whole life, and accumulation universal life. Group life is simulated as a term product. The following assumptions vary by product type.
 - Attained Age and Policy Duration
 - Face Amount
 - Lapse Rates
 - Post-level Term Mortality
 - Reserve Factors
- **Attained Age and Duration:** These are weightings by product that vary by attained age and duration.
- **Face Amount:** These are weightings by product for various face amount sizes.

Mortality Risk Drivers

The model projects four categories of mortality risk through stochastic simulation: volatility, level, trend, and catastrophe. See the Experience Mortality Rates section for a description of the base mortality rates (referenced by q in the following formulas).

1. **Volatility Risk:** The risk of natural statistical deviations in mortality experience. These natural statistical deviations from expected deaths are represented in the model through a binomial distribution. Volatility risk decreases with increased exposure, and thus is lower for larger blocks than smaller blocks.

$$\bullet \text{ Prob}[\text{Deaths} = n] = \binom{\text{Policies}}{n} * q^n * (1 - q)^{\text{Policies} - n}$$

2. **Level Risk:** The risk of incorrect experience mortality assumptions. This risk is also known as pricing risk. The level risk parameters were developed from two components. This component is consistent with the level risk component used by the Academy C2 Longevity Risk Task Force to develop RBC C-2 factors for longevity products.
 - a. Statistical Sampling Volatility (Credibility): Assumes mortality rates are set with experience studies. Credibility of estimates is dependent on study size (number of policies and years in the study)

$$\bullet \text{ Cred}(\sigma) = \sqrt{\frac{q * (1 - q)}{\text{Number of Policies} * \text{Study Years}}} / q$$

- Study Years: 5 years was selected to represent a company's typical experience study period.
- q per 1K: represents the experience mortality rate in the first projection year expressed per 1,000 lives. This value is calculated from initial inforce cells from the

experience mortality tables (2017 CSO tables for individual life, 2016 group life experience table for group life).

- q: experience mortality rate in the first projection year, derived from “q per 1K”.

b. Natural Mortality Volatility: Assumes that there is natural volatility around the mortality mean.

- $\text{NatVol}(\sigma) = 2.2\% / \sqrt{\text{Study Years}}$
- The 2.2% implied annual volatility was derived from an insured age-weighted regression on U.S. Social Security data from 1950 to 2014.
- Study Years: the natural mortality volatility scales down with the number of years in a company’s study period. 5 years was selected to represent a company’s typical experience study period.

c. Overall Level Mortality Volatility: The statistical sampling and natural volatility components are combined assuming independence.

$$\sigma_L = \sqrt{\text{Cred}(\sigma)^2 + \text{NatVol}(\sigma)^2}$$

d. Level Mortality Mean: The average pricing error is assumed to be 0.00%.

$$\mu_L = 0.00\%$$

3. **Trend Risk:** The risk that future mortality improvement is different than assumed. Historically, both mortality improvement (MI) and MI volatility have differed by historical period, gender, and age, among others. While average MI over long periods tends to stabilize, period to period MI can be quite different. An improvement distribution that captures these characteristics was developed while balancing the desire for simplicity. Deviation in mortality improvement is modeled across male/female and young/ middle/old ages as correlated normally distributed random variables. An MI deviation is generated for each cohort in each year of each scenario. This allows for large differences year-to-year consistent with historical data.

MI Deviation	Male	Female
Young (<45)	$D_{Y,M}$	$D_{Y,F}$
Middle(45-79)	$D_{M,M}$	$D_{M,F}$
Old(80+)	$D_{O,M}$	$D_{O,F}$

➔ $[D_{Y,M}, D_{M,M}, \dots, D_{O,F}] \sim N(\mu, \Sigma)$

Where:

- μ = zero vector = [0, 0, ..., 0]
- Σ = covariance matrix calibrated with social security data 1950+

a. Years Since Study: 3 years was selected to represent a typical time period since a company’s last mortality experience study was completed. Mortality improvement is stochastically projected 3 years from the experience study table date to the model start date.

- b. Covariance Matrix: Historical mortality improvement and covariance between gender and age was calibrated from insured age-weighted U.S. Social Security data from 1950 to 2014, consistent with the data source for level risk. The covariance matrix is shown in the following table, and the resulting correlations are shown as well.

		Males			Females		
Covariance		Young	Middle	Old	Young	Middle	Old
Males	Young	0.00085	0.00018	0.00016	0.00050	0.00015	0.00012
	Middle	0.00018	0.00023	0.00027	0.00016	0.00017	0.00024
	Old	0.00016	0.00027	0.00050	0.00018	0.00025	0.00048
Females	Young	0.00050	0.00016	0.00018	0.00055	0.00019	0.00019
	Middle	0.00015	0.00017	0.00025	0.00019	0.00019	0.00027
	Old	0.00012	0.00024	0.00048	0.00019	0.00027	0.00056

		Male	Male	Male	Female	Female	Female
Correlation		Young	Middle	Old	Young	Middle	Old
Male	Young	1.00000	0.41796	0.24114	0.73152	0.37883	0.16771
Male	Middle	0.41796	1.00000	0.79815	0.45102	0.79461	0.68000
Male	Old	0.24114	0.79815	1.00000	0.34168	0.79350	0.90577
Female	Young	0.73152	0.45102	0.34168	1.00000	0.59030	0.34196
Female	Middle	0.37883	0.79461	0.79350	0.59030	1.00000	0.81325
Female	Old	0.16771	0.68000	0.90577	0.34196	0.81325	1.00000

- c. Cholesky Decomposition Matrix: The covariance matrix was translated for model input through Cholesky Decomposition using Python.

		Males			Females		
Chol Decomp Matrix		Young	Middle	Old	Young	Middle	Old
Males	Young	0.02921	0.00000	0.00000	0.00000	0.00000	0.00000
	Middle	0.00632	0.01375	0.00000	0.00000	0.00000	0.00000
	Old	0.00537	0.01708	0.01321	0.00000	0.00000	0.00000
Females	Young	0.01715	0.00375	0.00168	0.01545	0.00000	0.00000
	Middle	0.00528	0.00976	0.00386	0.00384	0.00644	0.00000
	Old	0.00396	0.01583	0.01390	0.00250	0.00445	0.00841

4. **Catastrophe Risk:** The risk of a short-term spike in mortality or a longer-term increase in mortality from a currently unknown health event. This risk includes 3 components: a pandemic risk distribution, a terrorism risk distribution, and an unknown sustained risk distribution.

- a. **Pandemic Risk:** The risk of a one-year increase in mortality from a new pandemic, such a new flu strain. The distribution is discrete and was calibrated from historical observations and multiple sources: current RBC, Swiss Re’s model, Solvency II, U.S. Centers for Disease Control and Prevention (CDC)/Department of Health and Human Services Pandemic Severity Assessment Framework (PSAF). Rates are expressed as deaths per 1,000 lives and are applied as an add-on

Annl. Prob	Dths/1K
0.50%	1.5
0.50%	0.7
0.50%	0.55
0.50%	0.35
0.50%	0.2
0.50%	0.1
0.50%	0.05
96.50%	0

across all ages if triggered. Multiple pandemics may occur in a given scenario.

- b. *Terrorism Risk*: The risk of a one-year increase in mortality from a terrorism event. The discrete distribution was calibrated based on U.S. life insurer experience from the Sept 11, 2011 terrorism events.

Annl. Prob	Dths/1K
5.00%	0.05
95.00%	0

The rate is expressed as deaths per 1,000 lives and is applied as an add-on across all ages if triggered. Multiple terrorism events may occur in a given scenario.

- c. *Unknown Sustained Risk*: The risk of a sustained increase in mortality from an unknown health event. The discrete distribution was calibrated from two historical health events impacting the U.S. population: HIV and opioid abuse. The

Max Duration	10
Annl. Prob	Scalar
2.50%	5.0%
97.50%	0.0%

mortality increase is defined as a percentage increase applied across all ages if triggered. If the event is triggered in the scenario it continues for the lesser of the maximum duration assumption and remainder of the projection period. A 10-year period was selected for the maximum duration based on the historical events and to provide for an event lasting up to a decade. The maximum duration assumption is relevant only when modeling projection periods longer than this assumption. Given the sustained nature of the event, it can only occur once per scenario.

Reserve Mortality Margin

- **Load (Margin)**: A 5% load was used for the load built into reserve mortality rates. This is intended to represent the margin companies have to absorb moderately adverse mortality experience through the conservatism built into statutory reserve calculations. This assumption was used in the current RBC factors and was deemed to remain consistent with moderately adverse experience. Capital is thus determined for 95th percentile experience above moderately adverse outcomes as represented by the 5% load.

Experience Mortality Improvement

- Experience mortality improvement is set equal to the 2017 SOA mortality improvement scale for use with Actuarial Guideline (AG) 38 and VM-20. The rates vary by age and gender and are converted to lognormal rates for input in the model.

Lapse Rates

- Lapse rates are set for each product type and vary by issue age, policy duration and underwriting class. For the recommended individual life capital factors, the simulated lapses are a weighted average of the four product types. For a given risk exposure period, results are insensitive to the product type (including lapses) as shown in Sensitivity 4 under the Model Sensitivities section.
 - **10-Year Term**: Lapse rates were developed using a combination of the SOA/LIMRA U.S. Individual Life Insurance Persistency Study for 2005-2007 and the SOA/RGA² Report on the Lapse and Mortality Experience of Post-Level Premium Period Term Plans (2014). The 10-

² Reinsurance Group of America

Year Term product is assumed to be a level term product for 10 years. Lapse rates spike beginning in year 10 at the end of the level term period.

- **20-Year Term:** Lapse rates were developed using a combination of the SOA/LIMRA U.S. Individual Life Insurance Persistency Study for 2005-2007 and the SOA/RGA Report on the Lapse and Mortality Experience of Post-Level Premium Period Term Plans (2014). The 20-Year Term product is assumed to be a level term product for 20 years. Lapse rates spike beginning in year 20 at the end of the level term period.
- **Permanent Whole Life:** Lapse rates were developed using the SOA/LIMRA U.S. Individual Life Insurance Persistency Study for 2005-2007. The Permanent Whole Life product is assumed to be a whole life product. Lapse rates are higher in early policy years and grade down with policy duration.
- **Accumulation Universal Life:** Lapse rates were developed using the SOA/LIMRA U.S. Individual Life Insurance Persistency Study for 2005-2007. The UL product is assumed to be a cash value accumulation universal life product. Lapse rates are higher in early policy years and grade down with policy duration.
- **Group:** Lapse rates were set equal to 10 Year Term rates for the first 5 policy durations. Durations 6 and later were assumed to remain constant. Sensitivity testing demonstrated that group life results are relatively insensitive to lapse rates.

Post Level Term Mortality

- Mortality experience for 10-year and 20-year term products following the level premium period is set through these assumptions through actual to expected ratios. Mortality rates spike following the level premium period because healthy insureds find new coverage, while unhealthy insureds are more likely to keep the coverage due to insurability concerns. The post-level term mortality actual to expected rates were developed using the SOA/RGA Report on the Lapse and Mortality Experience of Post-Level Premium Period Term Plans (2014).

Experience Mortality Rates

- **Individual Life:** Experience mortality rates were set using the 2017 CSO Unloaded Age Nearest Birthday (ANB) tables and vary by gender, smoking status, and underwriting class. Each table is structured as select and ultimate by issue ages 18-95 and select period policy durations 1-25. The 10 individual life tables have the following naming convention:
 - **Gender:** Male (M) or Female (F)
 - **Smoking Status:** Non-smoker (NS) or Smoker (SM)
 - **Underwriting Class:** Super Preferred (1), Preferred (2 for NS, 1 for SM), Residual (3 for NS, 2 for SM)
- **Group Life:** Experience mortality rates were developed using the SOA 2016 Group Life Experience Committee Report study. The table is structured by gender (male and female) and attained age.

Reserve Factors

- **Permanent Life:** Reserve factors for permanent life (whole life and cash value accumulation universal life) plans were developed using the 2017 CSO tables with a 3.5% interest rate and vary by gender and smoking status. Each table is structured as by issue ages 20-75 in 5-year increments and policy durations 1-101. The 4 individual life tables have the following naming convention:
 - **Gender:** Male (M) or Female (F)
 - **Smoking Status:** Non-smoker (NS) or Smoker (SM)
- **Term Life:** Reserve factors for term life (level term 10 and level term 20) plans were developed using the 2017 CSO tables with a 4.5% interest rate and vary by gender, smoking status, and underwriting class. Each table is structured as by issue ages 20-75 in 5-year increments and policy durations 1-10 for level term 10 and 1-20 for level term 20. The 20 individual life tables have the following naming convention:
 - **Product:** Level Term 10 (LT10) or Level Term 20 (LT20)
 - **Gender:** Male (M) or Female (F)
 - **Smoking Status:** Non-smoker (NS) or Smoker (SM)
 - **Underwriting Class:** Super Preferred (1), Preferred (2 for NS, 1 for SM), Residual (3 for NS, 2 for SM)
- **Group Life:** Reserves for group life were set simply as a yearly renewable term (YRT) reserve equal to $\frac{1}{2}$ of the mortality rate for a given cohort based on gender and attained age. A separate table of factors was not needed.

Capital Factor Quantification Method

The capital need, expressed as a dollar amount, is determined as the GPVAD at the 95th percentile of the stochastic distribution of scenarios over the remaining lifetime of a block of business while appropriately reflecting the pricing flexibility to adjust current mortality rates. Statutory losses are defined as the after-tax quantification of gross death benefits minus reserves released minus mortality margin present in reserves. The after-tax statutory losses are discounted to the present by using 20-year averages for U.S. swap rates. By selecting the largest present value accumulated loss across all projection years, the solved for capital ensures survival at all projection periods. Earlier period losses are not allowed to be offset by later period gains to reduce capital. The 95th percentile is the regulator accepted statistical safety level used for Life RBC C-2 mortality risk to identify weakly capitalized companies. The after-tax capital needs are translated to a factor expressed as a percentage of the initial NAR and are shown as amount per \$1,000 of NAR. The pre-tax factor is determined by taking the after-tax factor divided by (1 minus the tax rate).

Model Results

Overall Results and Recommended C-2 Factors

The recommended pre-tax factors per \$1,000 of retained NAR are shown in Table 1 below. Business assumed by reinsurers is treated as direct for reinsurer financial statements. The factors are differentiated by individual & industrial life and group & credit life, consistent with the current framework. The modeling focused on individual and group life, and the work group evaluated the continued appropriateness of applying the factors to industrial life and credit life business. It is recommended that industrial life and credit life continue to be mapped to individual and group life, respectively, as the product attributes are similar. The factors are rounded to the nearest 0.05 to recognize the randomness inherent in the model (see Impact of Random Number Seed for additional information). Three size bands are recommended to represent inforce blocks of small, medium, and large sizes. This reflects combining the two middle categories in the current framework. The size bands continue to be relevant and appropriate as a material portion of life insurers are represented within each category.

Within individual & industrial life, the factors are differentiated into three product categories: ULSG, term life, and all other life. The product definitions are consistent with the annual statement – analysis of operations by line of business – individual life insurance and VM-20. The differences by product category are the sole result of applying different risk exposure periods to an aggregate life inforce block. As described in Sensitivity 4 Individual Life Products under Model Sensitivities, the model produces consistent results by product for a given risk exposure period, as expressing the factor as a percentage of net amount at risk neutralizes product differences.

ULSG factors are the highest due to the longest current mortality rate guarantees and are based on a 20-year risk exposure period for a mature inforce block. Term life factors are based on a typical 10-year risk exposure period for a mature inforce block. The industry is concentrated in 10-, 20- and 30-year level term. All other life factors are based on a 5-year risk exposure period and assume inforce pricing may be adjusted following adverse mortality experience due to the presence of non-guaranteed elements. Examples are universal life products without secondary guarantees and participating whole life products.

Within group & credit life, the factors are differentiated into two categories based on the remaining length of the premium term based on company records by group contract. The two categories are remaining rate terms over 3 years and remaining rate terms 3 years and under. The remaining rate terms over 3 years category is represented by a 5-year risk exposure period, and the remaining rate terms 3 years and under is represented by a 3-year risk exposure period. The risk exposure periods recognize a time lag between when experience emerges and when pricing is adjusted.

<i>Pre-Tax RBC C-2 Factors</i>	Individual & Industrial Life				Group & Credit Life		
	Universal Life with Secondary Guarantee (ULSG)	Term Life	All Other Life	% of Individual Life Insurers*	Remaining Rate Terms Over 3 Years	Remaining Rate Terms 3 Years and Under	% of Group Life Insurers*
<i>Per \$1,000 of Inforce NAR</i>							
First \$500M	3.90	2.70	1.90	43%	1.80	1.30	54%
Next \$24.5B	1.65	1.10	0.75	36%	0.70	0.45	33%
> \$25B	1.10	0.75	0.50	21%	0.45	0.30	12%

* as of 2019 annual statement reporting

Table 2 and Table 3 compare the recommended factors versus the current RBC factors in place as of 12/31/2020.

Table 2 - Individual & Industrial Life Comparison Versus Current RBC							
Pre-Tax RBC C-2 Factors	Individual & Industrial Life				Change vs Current RBC		
	Current RBC	ULSG	Term	All Other	ULSG	Term	All Other
<i>Per \$1,000 of Inforce NAR</i>							
First \$500M	2.23	3.90	2.70	1.90	75%	21%	-15%
Next \$4.5B	1.46	1.65	1.10	0.75	13%	-25%	-49%
Next \$20B	1.17	1.65	1.10	0.75	41%	-6%	-36%
> \$25B	0.87	1.10	0.75	0.50	26%	-14%	-43%

The overall individual life industry impact would be a modest decrease with industry exposure by NAR concentrated in term life business amongst large insurers. Factors increase for ULSG due to the long-term risk exposure period to current mortality rates. As indicated in Exhibit 1, factors decrease for products with near-term inforce pricing flexibility (i.e., all other category). Small ULSG and term carriers would experience an increase on retained business. However, reinsurance is typically used to transfer/mitigate the mortality risk.

Table 3 - Group & Credit Life Comparison Versus Current RBC					
Pre-Tax RBC C-2 Factors	Group & Credit Life			Change vs Current RBC	
	Current RBC	Remaining Rate Terms Over 3 Years	Remaining Rate Terms 3 Years and Under	Remaining Rate Terms Over 3 Years	Remaining Rate Terms 3 Years and Under
<i>Per \$1,000 of Inforce NAR</i>					
First \$500M	1.75	1.80	1.30	3%	-26%
Next \$4.5B	1.16	0.70	0.45	-40%	-61%
Next \$20B	0.87	0.70	0.45	-20%	-48%
> \$25B	0.76	0.45	0.30	-41%	-61%

The overall group industry impact would be a significant decrease in C-2 capital. The factors decrease for all but one category: small size for longer rate terms which stays about the same. Group life factors decreased due to the decades-long decline in experience mortality rates, and the risk exposure periods remain shorter term as compared to individual life.

Credit for Group Life Premium Stabilization Reserves

The current RBC formula includes a 50% credit for group life premium stabilization reserves to offset the group life C-2 requirement. This component was reviewed by the work group. Based on a theoretical framework and professional experience, the 50% factor was deemed to be an appropriate offset to the capital requirement.

Correlation with Longevity C-2

The updated Life C-2 mortality modeling was completed consistent with the development of the adopted Longevity C-2 factors and correlation factor. Therefore, the work group opines that additional review of the adopted correlation factor is not necessary because of the updates to the Life C-2 mortality factors being recommended by this work group.

Attribution Analysis

The model mortality risk components were analyzed to determine the relative contribution to the overall recommended factors. Charts 1 and 2 below show the results of the attribution analysis for individual and group life. Individual and group life have similar breakdowns by inforce block size with small differences due to the inforce mix, experience mortality rates and other assumptions. For small inforce blocks, the primary mortality risk drivers are volatility and level risks. For large inforce blocks, catastrophe and trend risks become the primary drivers. For medium inforce blocks, the risks are relatively balanced between categories.



95th Percentile Mortality Increase

The 95th percentile capital factors were translated into overall mortality increases (% increase vs experience mortality) for the projection period. Table 4 highlights the results. As expected, the higher the capital factor, the larger the mortality increase. Differences between individual and group life are due to lapse assumptions. Group life has a higher overall lapse rate, which translates into a larger mortality increase needed to reproduce a given capital factor.

	Inforce Block Size		
	Large	Medium	Small
Individual Life	8%	10%	22%
Group Life	10%	14%	31%

Model Sensitivities

Various sensitivity tests were performed to understand the results of the model under alternative assumptions. Most of the sensitivities were based on the individual life large inforce block size for a 5-year exposure period. However, the sensitivities are similar for group life (if applicable), for the small and medium inforce block sizes, and for different risk exposure periods.

1. Random Number Seed

The model results vary slightly depending on the initial random number seed selected as shown in the table below. As a result of these fluctuations even when running 10,000 scenarios, the recommendation was to round the factors to the nearest 0.05.

Sensitivity 1 - Impact of Random Number Seed	
<i>Pre-Tax RBC C-2 Factors</i>	Individual Life - Large Size
<i>Per \$1,000 of Inforce NAR</i>	Fluctuation
RN Seed 5	0.03
RN Seed 15	0.03
RN Seed 35	0.04
RN Seed 45	0.04
RN Seed 55	0.02
RN Seed 65	0.04
RN Seed 75	0.03
RN Seed 85	0.04
RN Seed 95	0.03

2. Mortality Load (Margin)

Sensitivities under alternative mortality loads of 2.5% and 0% are shown in the table below. Lowering the mortality load increases the factor as this assumption is used to represent the amount of mortality margin embedded in statutory reserves. The 5% assumption maps to a 1 standard deviation moderately adverse standard at approximately the 85th percentile. For smaller inforce blocks the 5% mortality load covers less than 1 standard deviation of mortality experience due to the volatility and level risks present with low mortality credibility.

Sensitivity 2 - Reserve Mortality Load Assumption			
<i>Pre-Tax RBC C-2 Factors</i>	Individual Life - Large Size		
<i>Per \$1,000 of Inforce NAR</i>	Factor	Difference	Percentile
5% Reserve Mortality Load	0.50	-	≈ 85th
2.5% Reserve Mortality Load	0.69	0.19	≈ 70th
0% Reserve Mortality Load	0.91	0.41	50th

3. Attained Age

Model results are stable for most of the initial attained age categories. The exception is for older attained ages where the factors increase due to higher mortality rates. Exposure to attained ages 65 and older is relatively small in the assumed inforce mixes based on industry data. However, if a company is concentrated in older age inforce business, then it is subject to higher mortality risk. The recommended factors are not differentiated by attained age due to the low percentage of inforce policies at older attained ages and the data not being readily available in the annual statements.

Sensitivity 3 - Results by Initial Attained Age						
<i>Pre-Tax RBC C-2 Factors</i>	Individual Life - Large Size			Group Life - Large Size		
	Factor	Difference	% of Inforce	Factor	Difference	% of Inforce
Inforce Mix	0.50	-	100%	0.47	-	100%
Age 25	0.47	-0.03	7%	0.46	0.00	11%
Age 35	0.50	0.00	16%	0.50	0.03	24%
Age 45	0.49	0.00	29%	0.45	-0.02	29%
Age 55	0.50	0.00	28%	0.47	0.00	25%
Age 65	0.62	0.12	15%	0.59	0.12	10%
Age 75	1.37	0.87	6%	1.39	0.93	1%

4. Individual Life Products

Model results by individual life product type are relatively stable as shown in the table below. Expressing the capital factors as a percentage of net amount at risk neutralizes product differences. For example, term life products have higher relative net amounts at risk than permanent life products for mature blocks, but the mortality risk is proportionate to the net amount at risk. Therefore, term products will tend to have higher dollar amounts of capital per policy or per unit of face amount due to being subject to higher net amounts at risk.

Given the small product differences, the recommended factors were developed by differentiating the projection period on an entire mix of inforce business containing all products. The risk exposure period as represented by the projection period is the critical variable in recognizing product differences.

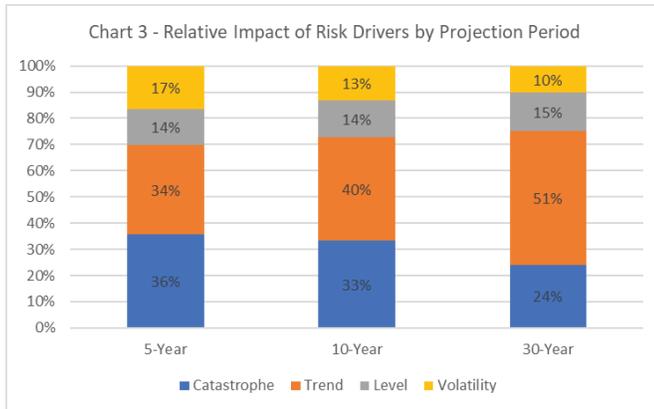
As discussed in the *Limitations* section, product features are modeled at a very basic level and consider differences in base statutory reserves, lapses, post level term mortality experience, face amounts and attained ages.

Sensitivity 4 - Results by Product Type			
Pre-Tax RBC C-2 Factors	Individual Life - Large Size		
Per \$1,000 of Inforce NAR	Factor	Difference	% of Inforce
Inforce Mix	0.50	-	100%
Level Term 10	0.51	0.01	25%
Level Term 20	0.43	-0.07	25%
Whole Life	0.47	-0.03	35%
Universal Life	0.42	-0.08	15%

5. Longer Projection Periods

The length of the projection period is a key assumption and is intended to represent the risk exposure period to current mortality rates over the remaining lifetime of a block of business. The impact of longer projection periods is shown in the table and chart below. Mortality risk increases with projection period as it exposes a company increasingly to trend risk and longer-term mortality shocks.

Sensitivity 5 - Results by Projection Period		
Pre-Tax RBC C-2 Factors	Individual Life - Large Size	
Per \$1,000 of Inforce NAR	Factor	Difference
5-Year Projection	0.50	-
10-Year Projection	0.76	0.26
15-Year Projection	0.97	0.47
20-Year Projection	1.10	0.61
30-Year Projection	1.30	0.80



6. Gender

Model results by gender are small as shown in the table below.

Sensitivity 6 - Results by Gender			
Pre-Tax RBC C-2 Factors Per \$1,000 of Inforce NAR	Individual Life - Large Size		
	Factor	Difference	% of Inforce
Inforce Mix	0.50	-	100%
Female	0.45	-0.04	45%
Male	0.51	0.01	55%

7. Underwriting Class

Model results were measured for the best underwriting class (lowest experience mortality) and worst underwriting class (highest experience mortality), which highlights that factor increase slightly with higher experience mortality. However, it's important to note that the mortality risk assumptions would be different if they were calibrated by underwriting class (versus the approach used to develop assumptions appropriate for the entire industry / inforce mix). Arguably, companies concentrated in exposure to less healthy / lower underwriting classes would be subject to higher mortality risk due to the higher experience mortality rates. The recommended factors are not differentiated by underwriting class due to the low percentage of inforce policies at residual underwriting classes and the data not being readily available in the annual statements.

Sensitivity 7 - Results by Underwriting Class			
Pre-Tax RBC C-2 Factors Per \$1,000 of Inforce NAR	Individual Life - Large Size		
	Factor	Difference	% of Inforce
Inforce Mix	0.50	-	100%
Non-Smoker Best Class	0.46	-0.03	35%
Smoker Residual Class	0.63	0.13	7%

8. Face Amount

The model was run with the smallest and largest face amounts which confirmed the impact of the face amount assumptions is small.

Sensitivity 8 - Results by Face Amount			
<i>Pre-Tax RBC C-2 Factors</i>	Individual Life - Large Size		
<i>Per \$1,000 of Inforce NAR</i>	Factor	Difference	% of Inforce
Inforce Mix	0.50	-	100%
Smallest Face (\$17.5K)	0.45	-0.05	19%
Largest Face (\$7.5M)	0.45	-0.05	0.3%

9. Discount Rate

The impact of an alternative (higher) discount rate was assessed, and the impact is small. The longer the projection period, the greater the impact.

Sensitivity 9 - Impact of Discount Rate		
<i>Pre-Tax RBC C-2 Factors</i>	Individual Life - Large Size	
<i>Per \$1,000 of Inforce NAR</i>	Factor	Difference
3.5% Discount Rate - 5-Year	0.50	-
5% Discount Rate - 5-Year	0.48	-0.01
3.5% Discount Rate - 10-Year	0.76	-
5% Discount Rate - 10-Year	0.72	-0.04
3.5% Discount Rate - 20-Year	1.10	-
5% Discount Rate - 20-Year	1.00	-0.11

10. Tax Rate

The pre-tax factors are impacted very slightly by the tax rate through discounting (after-tax cash flows are discounted at an after-tax discount rate). The impact becomes slightly greater with longer projection periods. There is obviously a direct impact to the after-tax factors and RBC amounts based on the applicable corporate tax rate.

Sensitivity 10 - Impact of Tax Rate		
<i>Pre-Tax RBC C-2 Factors</i>	Individual Life - Large Size	
<i>Per \$1,000 of Inforce NAR</i>	Factor	Difference
21% Tax Rate	0.50	-
35% Tax Rate	0.51	0.01

11. Larger Number of Inforce Policies

A sensitivity test was performed with an even larger number of inforce policies to assess the impact. The volatility risk component is directly impacted by the inforce policies assumption. At 5 million inforce policies, the factor ends up a little lower. However, the volatility risk component can't go lower than 0. Therefore, increasing the number of inforce policies beyond 1 million or even 5 million won't materially decrease the large size factors.

Sensitivity 11 - Impact of Larger Number of Inforce Policies		
<i>Pre-Tax RBC C-2 Factors</i>	Individual Life - Large Size	
<i>Per \$1,000 of Inforce NAR</i>	Factor	Difference
1 Million Policies	0.50	-
5 Million Policies	0.43	-0.06

12. Larger Retention Limit

A larger retention limit increases the large size pre-tax factor slightly due to increased fluctuation from the large face amounts inforce. This assumption is used primarily to control for inforce block size. Smaller inforce blocks are characterized by smaller retention limits as companies tend to reinsure mortality risk in excess of the capability to retain the risk on the balance sheet. If a company were to be concentrated in very large face amounts and a small amount of inforce policies, then it would be subject to higher mortality risk due to volatility.

Sensitivity 12 - Impact of Larger Retention Limit		
<i>Pre-Tax RBC C-2 Factors</i>	Individual Life - Large Size	
<i>Per \$1,000 of Inforce NAR</i>	Factor	Difference
\$1 Million Retention	0.50	-
\$10 Million Retention	0.54	0.04

13. Group Life Lapse Rates

A sensitivity test was performed with lower group life lapses to confirm that results are insensitive to this assumption. A 4% average annual lapse rate was assumed for sensitivity versus base lapse rates around 8% per year. The results confirmed that changes to this assumption do not materially change the results.

Sensitivity 13 - Impact of Lower Group Life Lapses - 5-Year		
<i>Pre-Tax RBC C-2 Factors</i>	Group Life - Large Size	
<i>Per \$1,000 of Inforce NAR</i>	Factor	Difference
Base Lapse Rates	0.466	-
4% Lapse Rates	0.474	0.007

14. Unknown Catastrophe Risk Probability

During the development of the unknown sustained catastrophe component, there was much debate surrounding the probability of the event occurring. There were arguments for both a 2.5% and 5% annual probability with the 2.5% ultimately being the work group's recommendation. As shown in the table below, increasing the annual probability from 2.5% to 5.0% has only a modest impact on the factor. The reason for this result resides in the cumulative probabilities over the projection period. Since the factor is determined at the 95th percentile, both assumptions result in the unknown risk event being triggered (i.e. cumulative probabilities greater than 5%). The annual probability assumption therefore impacts the length of the event as once the event is triggered it is sustained for the rest of the projection period. A higher probability assumption increases the likelihood of a longer event occurring.

Sensitivity 14 - Unknown Catastrophe Risk Probability			
<i>Pre-Tax RBC C-2 Factors</i>	Individual - Large Size		Cumulative Probability
<i>Per \$1,000 of Inforce NAR</i>	Factor	Difference	
2.5% Annual Probability	0.50	-	12%
5% Annual Probability	0.53	0.03	23%

15. Individual Life Lapses

As with group life, results are relatively insensitive to lapse rates. While a separate sensitivity test is not shown here, differences in lapses are reflected in the product differences (see sensitivity test 4).

Comparison Versus Other Capital Regimes

The work group reviewed characteristics of non-U.S. based capital regimes to evaluate the mortality risks covered and capital requirements versus the results of this project. Other capital regimes have different intended purposes, so differences were expected. The reviews of other capital regimes confirmed that the U.S. Life RBC model includes the same mortality risk types and at an overall magnitude in the proximity of other regimes. One overall difference versus other regimes is that internal company-based modeling is used (or there is the company option to use).

- *Canada Life Insurance Capital Adequacy Test*: The Canadian framework assesses the same mortality risk components as the U.S. Life RBC model: volatility, level, trend, and catastrophe risks. The framework differs in that the capital requirement is unique to each individual company and is determined through company determined modeling.
- *International Association of Insurance Supervisors (IAIS) Insurance Capital Standard (ICS)*: The IAIS framework uses a stress-based framework with shocks to the level of mortality (+10%), the trend in mortality, and the volatility in mortality. There is a separate catastrophe risk component equating to an additional 1 death per thousand. This framework is also completed through modeling by each individual entity. Management responses to mortality events are reflected in the modeling. The ICS separately has a basic capital requirement equating to a factor of 0.56 per thousand of NAR.
- *Solvency II*: This framework applies mortality stresses assessed at the 99.5th confidence interval. The standard formula applies a 15% mortality rate increase and is intended to cover volatility, trend, and level risks. The catastrophe risk is modeled as an additional 1.5 deaths per thousand. Companies have the option to use an approved internal model in place of the standard formula.
- *Standard & Poor's (S&P) Ratings Model*: S&P uses a factor-based approach in assessing U.S. life insurer ratings. For mortality risk, the ratings model recognizes inforce block size differences, and the factors scale down with increasing inforce block size. For the BBB category, the capital factors range from 0.57 per thousand of NAR for the largest inforce blocks (> \$100B NAR) to 2.29 per thousand of NAR for the smallest inforce blocks (< \$1B NAR). Arguably, having capital below BBB levels is indicative of being weakly capitalized as a company would be rated below investment grade.

Validation and Peer Review

Model assumptions were developed by the work group through reviewing current mortality research and studies applicable to the U.S. life insurance industry. The assumptions were discussed, reviewed, and agreed upon through the work group's bi-weekly calls. Model results and sensitivities were also reviewed extensively by the work group. The work group also provided several updates to the NAIC Life Risk-Based Capital Working Group throughout the project and feedback was obtained from regulators.

The model was independently peer reviewed by a member of the work group. The peer review confirmed that the calculations performed by the model were reasonable for the intended purpose and were being applied as intended. The detailed results of the peer review are documented separately by the work group.

Additional detailed documentation on model assumptions, output structure and modeling methodology was created by the work group and may be made available upon request.

Limitations

The model is intended to stochastically project through stochastic simulation the run-off of inforce life insurance blocks typical of U.S. life insurers in order to develop capital factors for use in the NAIC RBC formula for C-2 life insurance mortality risk. Other uses outside of this intended purpose may not be appropriate.

Product features in the model were developed at a very basic level and consider differences in base statutory reserves, lapses, post level term mortality experience, face amounts and attained ages. The model is not designed to replicate detailed product and inforce block characteristics unique to individual companies. In particular, ULSG products were not directly modeled. The work group concluded based on the modeling that the capital factors are insensitive to product differences for a given risk exposure period. The recommendation to differentiate based on product is an indirect way to get at the length of mortality rate guarantee, utilizes the current reporting structure of the annual statements, and is aligned with principles based reserving differentiation.

Draft: 11/1/21

Catastrophe Risk (E) Subgroup
Virtual Meeting (*in lieu of meeting at the 2021 Fall National Meeting*)
October 27, 2021

The Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Oct. 27, 2021. The following Subgroup members participated: Wanchin Chou, Chair, and Qing He (CT); Jane Nelson (FL); Laura Clements, Lynne Wehmueller, and Giovanni Muzzarelli (CA); Judy Mottar (IL); Gordon Hay (NE); Anna Krylova (NM); Halina Smosna and Gloria Huberman (NY); Tom Botsko and Dale Bruggeman (OH); Andrew Schallhorn (OK); and Miriam Fisk, Monica Avila, and Rebecca Armon (TX).

1. Adopted its Sept. 28 Minutes

The Subgroup met Sept. 28. During this meeting, the Subgroup took the following action: 1) discussed its 2021 working agenda; 2) heard a presentation from Karen Clark & Company (KCC) regarding the KCC U.S. wildfire model, which included the current wildfire trends and an overview of the KCC U.S. wildfire model; and 3) discussed the possibility of allowing additional third-party models or adjustments to the vendor models.

Mr. Schallhorn made a motion, seconded by Mr. Botsko, to adopt the Subgroup's Sept. 28 minutes (Attachment Four-A). The motion passed unanimously.

2. Discussed the Possibility of Allowing Third-Party Models to Calculate the Catastrophe Model Losses

Mr. Chou said during the Subgroup's previous meeting on Sept. 28, the Subgroup agreed that the KCC models for earthquakes and hurricanes meet the similar standards as the other approved commercial models had. He said a proposal was set up to include KCC earthquake and hurricane models as one of the approved third-party commercial vendor models to calculate the catastrophe risk charge.

3. Exposed Proposal 2021-15-CR (Adding KCC Models)

Mr. Chou said the purpose of the proposal is to include the KCC earthquake and hurricane models as one of the approved third-party commercial vendor models to calculate the catastrophe risk charge. He stated that the Florida Commission on Hurricane Loss Projection Methodology (FCHLPM) reviewed and verified the KCC hurricane model on June 4, 2021. The Subgroup believes that the KCC models seem to qualify under the same standards as the other modeling firms have for earthquakes and hurricanes. Mr. Chou asked the interested parties to review the proposal and provide comments during the exposure period.

The Subgroup agreed to expose proposal 2021-15-CR (Adding KCC Models) for a 30-day public comment period ending Nov. 26.

4. Heard an Update from its Catastrophe Model Technical Review Ad Hoc Group

Mr. Chou said the ad hoc group met Oct. 18 to discuss additional questions with Risk Management Solutions (RMS) on its wildfire model. She said the ad hoc group gained a better understanding on: 1) the landfire database; 2) historical data; 3) model parameters; 4) demand surge; and 5) period loss tables (PLTs) versus event loss tables (ELTs). Mr. Chou stated that there were 21 technical questions discussed with RMS, and he indicated that the ad hoc group will meet next month to review and discuss the impact analysis on different third-party commercial wildfire models.

Having no further business, the Catastrophe Risk (E) Subgroup adjourned.

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Draft: 10/12/21

Catastrophe Risk (E) Subgroup
Virtual Meeting
September 28, 2021

The Catastrophe Risk (E) Subgroup of the Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Sept. 28, 2021. The following Subgroup members participated: Wanchin Chou, Chair, Susan Andrews, and Qing He (CT); Robert Ridenour, Vice Chair, David Altmaier, and Jane Nelson (FL); Li Lim, Laura Clements, Giovanni Muzzarelli, Mitra Sanandajifar, and Lynne Wehmueller (CA); Judy Mottar (IL); Gordon Hay (NE); Anna Krylova (NM); Halina Smosna (NY); Tom Botsko and Dale Bruggeman (OH); Andrew Schallhorn (OK); Will Davis (SC); and Miriam Fisk, Andy Liao, Rebecca Armon, and Monica Avila (TX).

1. Discussed its 2021 Working Agenda

Mr. Chou said one of the items in the 2021 working agenda that will require being accomplished by the 2022 Spring National Meeting is the implementation of the wildfire peril in the Rcat component for informational purposes only. He said he expects the Catastrophe Model Technical Review Ad Hoc Group will finish the entire review process by end of October. Mr. Chou also stated that different modeling firms are in the stage of performing the impact analysis. Then, the Subgroup will start developing the formula structure of the wildfire peril base on the analysis results and findings. Mr. Chou said he anticipates the initial structure will be shared with all the interested parties at the Fall National Meeting.

2. Heard an Update from its Catastrophe Model Technical Review Ad Hoc Group

Ms. Wehmueller said the ad hoc group met twice to review some additional technical questions with Karen Clark & Company (KCC) on its wildfire model since the Summer National Meeting. She said the ad hoc group gained a better understanding on different aspects of its model during this question-and-answer (Q&A) section. She also said the ad hoc group will meet next month with Risk Management Solutions (RMS) to review/discuss some technical questions of its model. She said she anticipates the ad hoc group will have a better idea on how to implement the risk-based capital (RBC) charge for wildfire peril after the impact analysis is completed by the modeling firms.

3. Heard a Presentation from KCC Regarding the KCC U.S. Wildfire Reference Model

Glen Daraskevich (KCC) said this presentation includes the following main topics: 1) current wildfire trends; and 2) an overview of the KCC U.S. wildfire reference model. He stated that wildfires are a major driver of the U.S. insured losses, particularly in California. He indicated that the KCC U.S. Wildfire Model employs a physical modeling approach, which includes hazard, vulnerability, and financial modules. He stated that the hazard module predicts where the future events are most likely to occur. The vulnerability module estimates the level of damage that would occur to any type of structures. He also said the model has undergone meticulous validation of simulated events versus historical footprints, and it details evaluations of insurer claims data at an event and location resolution.

4. Discussed the Possibility of Allowing Additional Third-Party Models or Adjustments to the Vendor Models

Mr. Chou said another item listed in the working agenda that requires the Subgroup to address soon is to evaluate the possibility of allowing additional third-party models or adjustments to the vendor models to calculate the catastrophe model losses. He said the KCC earthquake and hurricane models have been reviewed and verified by the Florida Commission. He said he believes adding its models as one of the approved commercial models is worth considering. Mr. Botsko said he agrees. Scott Williamson (Reinsurance Association of America—RAA) said the RAA supports the KCC being added to the approval list. The seems to qualify under the same standards as the other modeling firms have. Mr. Chou said a proposal for adding the KCC models as one of the approval models for earthquake and hurricane perils will be drafted for discussion in the upcoming meeting.

Mr. Chou said the Subgroup will continue discussing all the outstanding issues in the meeting next month.

Having no further business, the Catastrophe Risk (E) Subgroup adjourned.

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Draft: 10/28/21

Property and Casualty Risk-Based Capital (E) Working Group
Virtual Meeting (*in lieu of meeting at the 2021 Fall National Meeting*)
October 25, 2021

The Property and Casualty Risk-Based Capital (E) Working Group of the Capital Adequacy (E) Task Force met Oct. 25, 2021. The following Working Group members participated: Tom Botsko, Chair, and Dale Bruggeman (OH); Wanchin Chou, Susan Andrews, and Qing He (CT); Nicole Altieri Crockett (FL); Judy Mottar (IL); Leatrice Geckler (NM); Halina Smosna (NY); Will Davis (SC); Rebecca Armon, Miriam Fisk, and Monica Avila (TX).

1. Adopted its Summer National Meeting Minutes

Mr. Botsko said the Working Group met July 22 in lieu of the Summer National Meeting and took the following action: 1) adopted its June 9 and April 27 minutes, which included the following action: a) adopted proposal 2021-05-P (Underwriting Risk Line 1 Factors); b) adopted proposal 2021-08-P (P/C Bond Factors and Instructions); c) adopted proposal 2021-03-P (Credit Risk Instruction Modification); d) forwarded the response to the Restructuring Mechanisms (E) Subgroup; and e) heard a presentation on property/casualty (P/C) risk-based capital (RBC) underwriting risk factors from the American Academy of Actuaries (Academy); 2) adopted the report of the Catastrophe Risk (E) Subgroup, which included the following action: a) adopted its June 1 and April 26 minutes; b) adopted its 2021 working agenda items; c) received an update from its Catastrophe Model Technical Review Ad Hoc Group and; and d) heard a presentation from AIR Worldwide on its wildfire model; 3) adopted the 2021 P/C RBC Newsletter; 4) discussed 2020 P/C RBC statistics; 5) discussed its 2021 working agenda items; and 6) heard a presentation on a P/C RBC underwriting risk project from the Academy.

Mr. Chou made a motion, seconded by Ms. Mottar, to adopt the Working Group's July 22 minutes (*see NAIC Proceedings – Summer 2021, Capital Adequacy (E) Task Force, Attachment Five*). The motion passed unanimously.

2. Adopted the Report of the Catastrophe Risk (E) Subgroup

Mr. Chou said the Subgroup met Sept. 28 and took the following action: 1) discussed its 2021 working agenda; 2) heard a presentation from Karen Clark & Company (KCC) regarding the KCC U.S. wildfire reference model; and 3) discussed the possibility of allowing additional third-party models or adjustments to the Vendor Models. He also stated that the Subgroup is finishing up the technical review with Risk Management Solutions (RMS) on the wildfire model and working on impact analysis with three wildfire modelers—AIR, KCC, and RMS. He said the Subgroup expects that the wildfire risk structure will be ready for discussion in December. He also indicated that the KCC hurricane models have been reviewed and verified by the Florida Commission. Most of the Subgroup members agreed that KCC seems to qualify under the same standards as the other modeling firms have for hurricane and earthquake.

Mr. Chou also provided an overview of the Subgroup's Oct. 27 meeting in lieu of the Fall National Meeting, which included the following action: 1) adopted its Sept. 28 minutes; 2) discussed the possibility of allowing third-party models calculate the catastrophe model losses; 3) considered exposure of proposal 2021-15-CR (Adding KCC Model); 4) heard an update from the Catastrophe Model Technical Review Ad Hoc Group; 5) heard a presentation from RMS regarding its Wildfire High Definition (HD) Model; and 5) discussed the impact analysis on different third-party commercial wildfire models.

Mr. Chou made a motion, seconded by Ms. Smosna, to adopt the report of the Catastrophe Risk (E) Subgroup (Attachment Four). The motion passed unanimously.

3. Exposed a Draft Recommendation to the Restructuring Mechanism (E) Subgroup

Mr. Botsko said the Runoff Ad Hoc Group met Oct. 13 to continue discussing the best course of treatment of runoff companies. He stated that the drafted recommendation indicated that a run-off company should include the following characteristics: 1) no renewing of policies for at least 12 months; 2) no new direct or assumed business; and 3) no additional runoff blocks of business. Mr. Botsko also said the ad hoc group agrees with the international treatment of runoff companies, which is handled through the Analysis and Exam Teams. In addition, the ad hoc group recommended that the Working Group adjust the instruction to better reflect the unique runoff characteristics, such as removing: 1) the trend test from the RBC calculation; 2) the charge for premium growth; and 3) Rcat from the RBC formula. Lastly, Mr. Botsko stated that this recommendation letter will be shared

with the Health Risk-Based Capital (E) Working Group and the Life Risk-Based Capital (E) Working Group for further consideration.

The Working Group agreed to expose the recommendation to the Restructuring Mechanism (E) Subgroup for a 30-day public comment period ending Nov. 24.

4. Exposed Proposal 2021-14-P (R3 Factor Adjustment)

Mr. Botsko said when the reinsurance recoverable credit risk charge was implemented in 2018, a load of operational risk was embedded in the R3 charge. Currently, the operational risk is separately addressed in the RBC as a stand-alone capital add-on; it results with duplication of the operational risk charge on the reinsurance recoverable component. He stated that this proposal intends to eliminate the double-counting effect of the operational risk charge on the component. He said NAIC staff performed an analysis to determine the impact on the RBC action levels by reducing the 2% reinsurance recoverable RBC charge for all reinsurance designation equivalents (Attachment Five-A). The result indicated that the impact is insignificant, as only three companies with Total Adjusted Capital (TAC) between zero to 75 million will change the RBC results from action level to no action.

The Working Group agreed to expose proposal 2021-14-P (R3 Factor Adjustment) for a 30-day public comment period ending Nov. 24.

5. Heard Updates on a P/C RBC Underwriting Risk Project from the Academy

David Traugott (Academy) provided a status on the recommended adjustments to the formulas for premium and reserve risk to reflect the impact of interest rates. He stated that this project is still a work in progress status; the results may change based on further review by the Academy Property and Casualty Risk-Based Capital Committee. He also stated that this presentation relates to premium risk only; an analysis of reserve risk is underway. During the presentation, he provided a brief overview of: 1) background of the Investment Income Adjustments (IIAs); 2) interest rate history 3) payment patterns; 4) risk charge versus interest rate; and 5) analysis of present value calibration. He also stated that the next steps in the Committee work plan include: 1) further examining the line-by-line risk charges to assess the extent to which the general approach described in the presentation is applicable by line; 2) applying the present value analysis to the RBC data for the short-tail lines; and 3) applying the same type of analysis to reserve risk.

Mr. Botsko said he appreciates all the Academy does for the Working Group. He said the Working Group will provide the needed support to ensure the projects are completed in time.

Having no further business, the Property and Casualty Risk-Based Capital (E) Working Group adjourned.

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2020 P&C RBC - Comparison of Action Levels
Current RBC Action Levels vs Alternative RBC Action Level
 Alternative RBC: 2% Reduction on Reinsurance Recoverable RBC Charge for ALL Reinsurance Designation Equivalents

(Excluding Companies with Negative TAC)

		2020 RBC Action Level under Current RBC Formula						Total
		MCL	ACL	RAL	CAL	Trend Test	No Action	
2020 RBC Action Level under Alternative RBC Formula	MCL	9						9
	ACL		2					2
	RAL		1	2				3
	CAL			1		13		14
	Trend Test					2	22	24
	No Action					2	2,420	2,423
Total		9	3	4	15	24	2,420	2,475

(Companies with TAC Between \$0 and \$5 Million)

		2020 RBC Action Level under Current RBC Formula						Total
		MCL	ACL	RAL	CAL	Trend Test	No Action	
2020 RBC Action Level under Alternative RBC Formula	MCL	6						6
	ACL		1					1
	RAL			2				2
	CAL					6		6
	Trend Test					1	5	6
	No Action					1	236	237
Total		6	1	3	7	5	236	258

(Companies with TAC Between \$5 and \$25 Million)

		2020 RBC Action Level under Current RBC Formula						Total
		MCL	ACL	RAL	CAL	Trend Test	No Action	
2020 RBC Action Level under Alternative RBC Formula	MCL	3						3
	ACL							0
	RAL							0
	CAL			1		5		6
	Trend Test					1	8	9
	No Action					1	761	762
Total		3	0	1	6	9	761	780

(Companies with TAC Between \$25 Million and \$75 Million)

		2020 RBC Action Level under Current RBC Formula						Total
		MCL	ACL	RAL	CAL	Trend Test	No Action	
2020 RBC Action Level under Alternative RBC Formula	MCL							0
	ACL		1					1
	RAL		1					1
	CAL							0
	Trend Test						5	5
	No Action					1	578	579
Total		0	2	0	0	6	578	586

(Companies with TAC Between \$75 Million and \$250 Million)

		2020 RBC Action Level under Current RBC Formula						Total
		MCL	ACL	RAL	CAL	Trend Test	No Action	
2020 RBC Action Level under Alternative RBC Formula	MCL							0
	ACL							0
	RAL							0
	CAL				2			2
	Trend Test						2	2
	No Action						430	430
Total		0	0	0	2	2	430	434

(Companies with TAC Between \$250 Million and \$1 Billion)

		2020 RBC Action Level under Current RBC Formula						Total
		MCL	ACL	RAL	CAL	Trend Test	No Action	
2020 RBC Action Level under Alternative RBC Formula	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test						1	1
	No Action						267	267
Total		0	0	0	0	1	267	268

(Companies with TAC Greater Than \$1 Billion)

		2020 RBC Action Level under Current RBC Formula						Total
		MCL	ACL	RAL	CAL	Trend Test	No Action	
2020 RBC Action Level under Alternative RBC Formula	MCL							0
	ACL							0
	RAL							0
	CAL							0
	Trend Test						1	1
	No Action						148	148
Total		0	0	0	0	1	148	149

Distributions of Percentage Change in 2020 RBC Ratios by Company Size under Alternative RBC Formula
Alternative RBC: 2.0% Reduction on Reinsurance Recoverable RBC Charge for ALL Reinsurance Designation Equivalents

RBC Ratio Change\TAC Range	\$0 to \$5	\$5 to \$25	\$25 to \$75	\$75 to \$250	\$250 to \$1,000	Over \$1,000	Total
Less than -50%	0	0	0	0	0	0	0
-50% to -25%	0	0	0	0	0	0	0
-25% to -15%	0	0	0	0	0	0	0
-15% to -5%	0	0	0	0	0	0	0
-5% to 5%	227	662	494	381	249	140	2,153
5% to 15%	12	56	33	22	9	8	140
15% to 25%	9	21	15	11	2	2	58
25% to 50%	5	18	21	12	5	1	62
Greater than 50%	5	23	23	8	3		62
Subtotal	258	780	586	434	268	149	2,475

Comparison of 2020 RBC Charge under Alternative RBC Formula
Alternative RBC: 2.0% Reduction on Reinsurance Recoverable RBC Charge for ALL Reinsurance Designation Equivalents

TAC Range (\$ Million)	\$0 to \$5	\$5 to \$25	\$25 to \$75	\$75 to \$250	\$250 to \$1,000	Over \$1,000	Total
R3 - Current	71,884,508	267,078,272	829,927,624	1,471,721,675	1,935,441,255	5,794,628,606	10,370,681,940
R3 - Alternative	56,439,676	183,797,021	536,125,852	916,477,625	1,278,922,632	4,052,194,696	7,023,957,502
Percentage Change	-21.5%	-31.2%	-35.4%	-37.7%	-33.9%	-30.1%	-32.3%
R4 - Current	394,872,924	798,332,703	2,428,351,877	7,678,683,209	19,336,240,504	99,340,612,630	129,977,093,847
R4 - Alternative	385,941,326	773,790,796	2,382,242,619	7,519,699,697	19,005,250,705	97,621,362,500	127,688,287,643
Percentage Change	-2.3%	-3.1%	-1.9%	-2.1%	-1.7%	-1.7%	-1.8%
RBC After Covariance (incl. Oper Risk) - Current	562,635,300	1,914,873,807	5,366,308,507	14,478,094,005	36,933,609,966	314,404,511,521	373,660,033,106
RBC After Covariance (incl. Oper Risk) - Alternative	547,596,925	1,852,681,348	5,154,973,034	14,028,875,322	36,390,326,203	312,701,382,248	370,675,835,080
Percentage Change	-2.7%	-3.2%	-3.9%	-3.1%	-1.5%	-0.5%	-0.8%

U.S. List of Catastrophes for Use in Reporting catastrophe Data in PR036 and PR100+

Type of Event	Name	Date	Location	Overall losses when occurred
Hurricane	Sandy	2012		\$ 50,000,000,000
Hurricane	Isaac	2012		\$ 970,000,000
Tropical Storm	Debby	2012		\$ 105,000,000
Earthquake		2014	California	25+ million
Hurricane	Patricia	2015		25+ million
Hurricane	Joaquin	2015		25+ million
Hurricane	Matthew	2016	Florida, North Carolina, South Carolina, Georgia and Virginia	\$ 2,698,400,000
Hurricane	Hermine	2016	Florida, North Carolina, South Carolina, Georgia and Virginia	\$ 245,640,000
Hurricane	Harvey	2017	Texas, Louisiana	25+ million
Hurricane	Jose	2017	East Coast of the United States	25+ million
Hurricane	Irma	2017	Eastern United States	25+ million
Hurricane	Maria	2017	Southeastern United States, Mid-Atlantic States	25+ million
Hurricane	Nate	2017	Louisiana, Mississippi, Alabama, Tennessee and Eastern United States	25+ million
Tropical Storm	Alberto	2018	Southeast, Midwest	25+ million
Hurricane	Lane	2018	Hawaii	25+ million
Tropical Storm	Gordon	2018	Southeast, Gulf coast of the United States, Arkansas and Missouri	25+ million
Hurricane	Florence	2018	Southeast, Mid-Atlantic	25+ million
Hurricane	Michael	2018	Southeastern and East Coasts of United States	25+ million
Hurricane	Dorian	2019	Southeast, Mid-Atlantic	500+ million
Hurricane	Barry	2019	Southeast, Midwest, Northeast	300+ million
Tropical Storm	Imelda	2019	Plains, Southeast	25+ million
Tropical Storm	Nestor	2019	Southeast	25+ million
Hurricane	Lorenzo	2019	Louisiana, Mississippi, Texas and Arkansas	25+ million
Tropical Storm	Cristobal	2020	Southeast, Plains, Midwest	150 million
Tropical Storm	Fay	2020	Southeast, Northeast	400 million
Hurricane	Hanna	2020	Texas	350 million
Hurricane	Isaias	2020	Southeast, Mid-Atlantic, Northeast	> 3 billion
Hurricane	Laura	2020	Plains, Southeast, Mid-Atlantic	> 4 billion
Hurricane	Sally	2020	Southeast (Alabama, Mississippi, Louisiana)	> 1 billion
Tropical Storm	Beta	2020	Plains, Southeast	25+ million
Hurricane	Delta	2020	Gulf Coast of United States, Southeast, Northeast (AL, GA, NC, SC, MS, LA, TX)	> 2 billion
Hurricane	Zeta	2020	Gulf coast of the United States, Southeastern United States, Mid-Atlantic	> 1.5 billion
Tropical Storm	Claudette	2021	Gulf Coast of the United States, Georgia, Carolinas	> 350 million
Hurricane	Elsa	2021	East Coast of the United States	1.2 billion
Tropical Storm	Fred	2021	Eastern United States (particularly Florida and North Carolina)	1.3 billion
Hurricane	Henri	2021	Northeastern United States	550 million
Hurricane	Ida	2021	Gulf Coast of the United States (especially Louisiana), East Coast of the United States (especially the Northeastern United States)	44 billion

Non U.S. List of Catastrophes For Use in Reporting Catastrophe Data in PR036 and PR100+

Year	Event Type	Begin	End	Event	Country	Affected Area (Detail)	Munich Re NatCATService Insured losses (in original values, US\$m) Criteria: insured losses equal/greater US\$ 25m. Tries to reflect non-US losses only	Swiss Re Sigma: Insured Loss Est. US\$m (mid point shown if range given) Mostly reflect total US and nonUS losses combined.	
2012	Earthquake	29/05/2012	29/05/2012	Earthquake	Italy	Emilia-Romagna, San Felice del Panaro, Cavezzo, Rovereto di Novi, Carpi, Concordia, Bologna, Mailand, Aosta Valley, Venice, Mirandola	1600	N/A	
2013	Tropical Cyclone	08/11/2013	12/11/2013	Typhoon Haiyan		Philippines, Vietnam, China	700	N/A	
2014	Earthquake	07/07/2014		Earthquake	Mexico, Guatemala		N/A	N/A	25+million
2014	Earthquake	04/01/14		Earthquake	Chile		N/A	N/A	100+million
2014	Earthquake	12/02/2014		Earthquake	China		N/A	N/A	350+million
2014	Earthquake	05/04/2014		Earthquake	China		N/A	N/A	80+million
2014	Earthquake	05/05/2014		Earthquake	Thailand		N/A	N/A	62+million
2014	Earthquake	05/24/14		Earthquake	China		N/A	N/A	60+million
2014	Tropical Storm	06/14/14	06/16/14	TS Hagibis	China		N/A	N/A	131+million
2014	Super Typhoon	07/08/14	07/11/14	STY Neoguri	Japan		N/A	N/A	100+million
2014	Super Typhoon	07/15/14	07/20/14	STY Rammasun		Philippines, China, Vietnam	N/A	N/A	570+million
2014	Typhoon	07/22/14	07/24/14	TY Matmo		Taiwan, China, Philippines	N/A	N/A	570+million
2014	Cyclone	01/10/14	01/12/14	CY Ian	Tonga		N/A	N/A	48+million
2014	Cyclone	04/10/14	04/14/14	CY Ita	Australia		N/A	N/A	1+billion
2015	Hurricane	08/16/92	08/28/92	Hurricane Andrew	Bahamas	Bahamas			> 25 million
2015	Hurricane	10/20/15	10/24/15	Hurricane Patricia		Central America, Mexico	N/A	N/A	> 25 million
2015	Typhoon	06/26/15	07/13/15	Typhoon Chan-hom (Falcon)		Guam, Northern Mariana Islands, Philippines, Japan, Taiwan, Chian, Korea, Russian Far East	N/A	N/A	> 25 million
2015	Severe Tropical Storm	07/01/15	07/10/15	Severe Tropical Storm Linfa (Egay)		Philippines, Taiwan, China	N/A	N/A	> 25 million
2015	Typhoon	07/02/15	07/18/15	Typhoon Nangka		Marshall Islands, Mariana Islands and Japan	N/A	N/A	> 25 million
2015	Typhoon	07/29/15	08/12/15	Typhoon Soudelor (Hanna)		Mariana Islands, Japan, Philippines, Taiwan, Eastern China and South Korea	N/A	N/A	> 25 million
2015	Typhoon	08/13/15	08/30/15	Typhoon Goni (Ineng)		Mariana Islands, Japan, Philippines, Taiwan, China, Russia and Korea	N/A	N/A	> 25 million
2015	Severe Tropical Storm	09/06/15	09/11/15	Severe Tropical Storm Etau		Japan, Russian Far East	N/A	N/A	> 25 million
2015	Typhoon	09/19/15	09/30/15	Typhoon Djuan (Jenny)		Ryukyu Islands, Taiwan, East China	N/A	N/A	> 25 million
2015	Typhoon	09/30/15	10/05/15	Typhoon Mujigae (Kabayan)		Philippines, Vietnam and China	N/A	N/A	> 25 million
2015	Typhoon	10/12/15	10/21/15	Typhoon Koppu (Lando)		Northern Mariana Islands, Philippines, Taiwan, Ryukyu Islands	N/A	N/A	> 25 million
2015	Typhoon	12/03/15	12/08/15	Storm Desmond		Ireland, Isle of Man, United Kingdom, Iceland, Norway and Sweden	N/A	N/A	> 25 million
2015	Hurricane	09/28/15	10/15/15	Hurricane Joaquin		Caribbean Islands, Portugal	N/A	N/A	> 25 million
2015	Earthquake	04/27/15		Earthquake	Nepal		N/A	N/A	> 25 million
2015	Earthquake	09/22/15		Earthquake	Chile		N/A	N/A	> 25 million
2016	Hurricane	08/28/16	09/06/16	Hurricane Hermine		Dominican Republic, Cuba, The Bahamas	N/A	N/A	> 25 million
2016	Tropical Cyclone	02/16/16	02/22/16	TC Winston		South Pacific Islands	N/A	N/A	> 25 million
2016	Earthquake	02/06/16		Earthquake	Taiwan	Asia	N/A	N/A	> 25 million
2016	Earthquake	01/03/16		Kaohsiung EQ	India, Bangladesh, Myanmar	Asia	N/A	N/A	> 25 million
2016	Earthquake	02/14/16		Christchurch EQ	New Zealand	Oceania	N/A	N/A	> 25 million
2016	Earthquake	04/14/16	04/16/16	Kumamoto EQs	Japan	Asia	N/A	N/A	> 25 million

Non U.S. List of Catastrophes For Use in Reporting Catastrophe Data in PR036 and PR100+

2016	Earthquake	04/16/16		Ecuador EQ	Ecuador	South America	N/A	N/A	> 25 million
2016	Tropical Cyclone	05/14/16	05/23/16	CY Roanu	Sri Lanka, India, Bangladesh, China	Asia	N/A	N/A	> 25 million
2016	Earthquake	08/24/16		Italy EQ	Italy	Europe	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/14/16	09/16/16	STY Meranti	China, Taiwan, Philippines	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	07/08/16	07/12/16	STY Nepartak	China, Taiwan	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/26/16	09/29/16	TY Megi	Taiwan, China	Asia	N/A	N/A	> 25 million
2016	Earthquake	09/10/16		Kagera EQ	Tanzania, Uganda	Africa	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/29/16	09/01/16	TY Lionrock	China, Japan, South Korea	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/19/16	09/22/16	TY Malakas	Japan, China	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/18/16	08/20/16	TS Dianmu	China, Vietnam	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	07/31/16	08/03/16	TY Nidia	China, Philippines, Vietnam	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/02/16	08/10/16	HU Earl	Belize, Mexico, Caribbean Islands	Caribbean Islands, Mexico and Central America	N/A	N/A	> 25 million
2016	Tropical Cyclone	08/22/16	08/23/16	TS Mindulle	Japan	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	09/06/16	09/08/16	HU Newton	Mexico	North America (non-U.S.)	N/A	N/A	> 25 million
2016	Tropical Cyclone	10/04/16	10/07/16	STY Chaba	Japan, Korea	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	10/16/16	10/22/16	STY Haima	Philippines, China	Asia	N/A	N/A	> 25 million
2016	Tropical Cyclone	10/14/16	10/20/16	TY Sarika	Philippines, China, Vietnam	Asia	N/A	N/A	> 25 million
2016	Earthquake	10/26/16		Central Italy EQ	Italy	Europe	N/A	N/A	> 25 million
2016	Earthquake	10/27/16		Central Italy EQ	Italy	Europe	N/A	N/A	> 25 million
2016	Earthquake	10/21/16		Tolton	Japan	Asia	N/A	N/A	> 25 million
2016	Hurricane	09/28/16	10/10/16	Hurricane Matthew		Caribbean Islands and Eastern Canada	N/A	N/A	> 25 million
2016	Hurricane	08/28/16	09/06/16	Hurricane Hermine		Dominican Republic, Cuba, The Bahamas	N/A	N/A	> 25 million
2017	Earthquake	01/18/17		Earthquake	Italy	Europe	N/A	N/A	> 25 million
2017	Earthquake	01/28/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Earthquake	02/10/17		Earthquake	Philippines	Asia	N/A	N/A	> 25 million
2017	Earthquake	03/27/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Cyclone	03/28/17	04/05/17	CY Debbie	Australia	Queensland, New South Wales, New Zealand	N/A	N/A	> 25 million
2017	Earthquake	05/11/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Typhoon	07/29/17	07/31/17	TY Nesat & TS Haitang	China, Taiwan, Philippines	Asia	N/A	N/A	> 25 million
2017	Typhoon	08/07/17	08/09/17	Typhoon Noru	Japan	Asia	N/A	N/A	> 25 million
2017	Earthquake	08/08/17		Earthquake	China	Asia	N/A	N/A	> 25 million
2017	Typhoon	08/23/17	08/24/17	TY Hato	China	Macau, Hong Kong	N/A	N/A	> 25 million
2017	Typhoon	08/25/17	08/28/17	TY Pakhar	China	Asia	N/A	N/A	> 25 million
2017	Hurricane	08/25/17	09/02/17	Hurricane Harvey		Caribbean Islands and Central America	N/A	N/A	> 25 million
2017	Hurricane	08/30/17	09/16/17	Hurricane Irma		Caribbean Islands and Cape Verde	N/A	N/A	> 25 million
2017	Hurricane	09/05/17	09/26/17	Hurricane Jose		Caribbean Islands and Eastern Canada	N/A	N/A	> 25 million
2017	Hurricane	09/16/17	10/03/17	Hurricane Maria		Caribbean Islands, UK, France and Spain	N/A	N/A	> 25 million
2017	Earthquake	09/07/17		Earthquake		Mexico, Guatemala	N/A	N/A	> 25 million
2017	Earthquake	09/19/17		Earthquake	Mexico	Mexico City	>200	N/A	> 25 million
2017	Hurricane	10/04/17		Hurricane Nate		Central America, Cayman Islands, Cuba Yucatan Peninsula	N/A	N/A	> 25 million
2018	Earthquake	02/06/18		Earthquake	Taiwan				> 25 million
2018	Earthquake	02/16/18		Earthquake	Mexico				> 25 million

Non U.S. List of Catastrophes For Use in Reporting Catastrophe Data in PR036 and PR100+

2018	Cyclone	02/09/18	02/20/18	CY Gita	Tonga, Fiji, Samoa, New Zealand				> 25 million
2018	Earthquake	02/26/18		Earthquake	Papua New Guinea				> 25 million
2018	Earthquake	03/05/18		Earthquake	Papua New Guinea				> 25 million
2018	Cyclone	03/17/18		CY Marcus					> 25 million
2018	Tropical Storm	05/23/18	05/27/18	Tropical Storm Mekunu	Yamen, Oman , Saudi Arabia				> 25 million
2018	Tropical Storm	06/02/18	06/07/18	Tropical Storm Ewiniar	Vietnam, China, Taiwan, Philippines and Ryukyu Islands	Guangdong Province, Jiangxi, Fujian, Zhejiang Provinces, and Hainan Island.			> 25 million
2018	Earthquake	06/18/18		Earthquake	Japan				> 25 million
2018	Super Typhoon	07/10/18	07/12/18	STY Maria	China, Taiwan, Guam and Japan	Fujian province, Yantze River Basin, Japan's Ryukyu Islands			> 25 million
2018	Tropical Storm	07/17/18	07/24/18	TS Sonh-Tinh	Vietnam, China, Laos	Japan, Russian Far East			> 25 million
2018	Tropical Storm	07/22/18	07/25/15	TS Ampil	China	Jiangsu, Zhejiang, Shandong, and Hebei			> 25 million
2018	Typhoon	07/27/18	08/03/18	TY Jongdari	Japan, China				> 25 million
2018	Earthquake	08/05/15	08/09/18	Earthquake	Indonesia				> 25 million
2018	Tropical Storm	08/09/18	08/15/18	TS Yagi	Philippines, China	Zhejiang, Anhui, Jiangsu and Shandong Provinces.			> 25 million
2018	Tropical Storm	08/13/18	08/19/18	TS Bebinca	China	Hong Kong, Guangdong and Hainan			> 25 million
2018	Typhoon	08/16/18	08/18/18	TY Rumbia	China	Shanghai, Jiangsu, Zhejiang, Anhui, Shandong and Henan			> 25 million
2018	Typhoon	08/23/18	08/25/18	TY Soulik	Japan, South Korea, China and Russia	Haenam County, South Jeolla Province			> 25 million
2018	Typhoon	09/04/18	09/05/18	RY Jebi	Japan, Mariana Islands, Taiwan, Japan, Russian Far East and Artic				> 25 million

Non U.S. List of Catastrophes For Use in Reporting Catastrophe Data in PR036 and PR100+

2018	Earthquake	09/06/18		Earthquake	Japan	Hokkaido			> 25 million
2018	Super Typhoon	09/15/18	09/18/18	STY Mangkhut	N. Mariana Islands, Philippines, China and Hong Kong				> 25 million
2018	Hurricane	Leslie	09/23/18	Hurricane Leslie	Azores, Bermuda, Madeira, Iberian Europe	Azores, Bermuda, Madeira, Iberian Peninsula, France			> 25 million
2018	Hurricane	10/07/18	10/16/18	Hurricane Michael	Central American, Yucatan Peninsula, Cayman Islands, Cuba, Atlantic, Canada				> 25 million
2019	Cyclone	05/03/19	05/05/19	Cyclone Fani	India, Bangladesh				>500 million
2019	Earthquake	06/17/19		Earthquake	China				> 25 million
2019	Tropical Storm	08/01/19	08/08/19	Tropical Storm Wipha	China, Vietnam				> 25 million
2019	Typhoon	08/09/19	08/11/19	Typhoon Lekima	China				> 855 million
2019	Typhoon	08/15/19	08/16/19	Typhoon Krosa	Japan				>25 million
2019	Hurricane	08/31/19	09/07/19	Hurricane Dorian	Caribbean, Bahamas, Canada				>1 billion
2019	Typhoon	09/05/19	09/08/19	Typhoon Lingling	Japan, China, Korea				>5.78 billion
2019	Typhoon	09/08/19	09/09/19	Typhoon Faxai	Japan				> 7 billion
2019	Hurricane	09/19/19	09/22/19	Hurricane Humberto	Bermuda				>25+ million
2019	Hurricane	09/17/19	09/26/19	Hurricane Lorenzo	Portugal				>25+ million
2019	Earthquake	11/26/19		Earthquake	Albania				>25+ million
2019	Cyclone	11/08/19	11/11/19	Cyclone Matmo (Bulbul)	India, Bangladesh				>25+ million
2019	Typhoon	10/01/19	10/02/19	Typhoon Hagibis	Japan				> 7 billion
2019	Earthquake	12/18/19		Earthquake	Philippines				>25+ million
2020	Earthquake	03/22/20		Earthquake	Croatia				>25+ million
		04/01/20	04/11/20	Cyclone Harold	Solomon Islands, Canuatu, Fiji, Tonga				> 25+ million
2020	Tropical Storm	05/31/20		Tropical Storm Amanda	El Salvador, Guatemala, Honduras				> 25+ million
2020	Tropical Storm	06/01/20	06/05/20	Tropical Storm Cristobal	Mexico, Guatemala, El Salvador				150 million
2020	Hurricane	07/25/20	07/27/20	Hurricane Hanna	Mexico				350 million
2020	Hurricane	07/28/20	08/01/20	Hurricane Isaias	Caribbean, Canada				> 3 billion
2020	Hurricane	08/22/20	08/25/20	Hurricane Laura	Caribbean				> 4 billion
2020	Typhoon	05/15/20	05/22/20	Typhoon Amphan	India, Bangladesh, Sri Lanka				15 billion
2020	Tropical Storm	06/03/20	06/04/20	Tropical Storm Nisarga	India				> 25+ million
2020	Typhoon	08/03/20	08/04/20	Typhoon Hagupit	China, Taiwan				> 100+ million
2020	Hurricane	10/05/20	10/12/20	Hurricane Delta	Jamaica, Nicaragua, Cayman Island, Yucatan Peninsula				> 2 billion
2020	Hurricane	10/24/20	10/30/20	Hurricane Zeta	Cayman Islands, Jamaica, Central America, Yucatan Peninsula, Ireland, United Kingdom				> 1.5 billion
2020	Cyclone	04/01/20	04/11/20	Cyclone Harold	Solomon Islands, Canuatu, Fiji, Tonga				> 25+ million
2020	Hurricane	10/31/20	11/14/20	Hurricane Eta	Colombia, Jamaica, Central America, Cayman Islands, Cuba, The Bahamas				> 7.9 billion

Non U.S. List of Catastrophes For Use in Reporting Catastrophe Data in PR036 and PR100+

2020	Hurricane	11/14/20	11/19/20	Hurricane Iota	ABC Islands, Colombia, Jamaica, Central America				> 1.4 billion
2020	Typhoon	11/22/20	11/23/20	Typhoon Goni	Philippines, Vietnam, Cambodia, Laos				> 400+ million
2020	Typhoon	11/08/20	11/15/20	Typhoon Vamco	Philippines, Vietnam, Laos, Thailand				> 400+ million
2021	Earthquake	01/14/21	01/14/21	West Sulawesi	Indonesia				> 58.1 million
2021	Earthquake	02/13/21	02/13/21	Fukushima Prefecture Offshore	Japan				1.3 billion
2021	Tropical Cyclone	05/17/21		Tropical Cyclone Tautae	India				> 25+ million
2021	Tropical Storm	06/19/21	06/23/21	Tropical Storm Claudette	Oaxaca, Veracruz, Atlantic Canada				> 25+ million
2021	Earthquake	06/21/21	06/21/21	China	Yunnan Dal				> 25+ million
2021	Earthquake	06/21/21	06/21/21	China	Southern Qinghai				> 25+ million
2021	Hurricane	07/01/21	07/14/21	Elsa	Lesser Antilles, Greater Antilles, Venezuela, Colombia, Atlantic Canada, Greenland, Iceland				50 million
2021	Typhoon	07/16/21	07/31/21	In-fa (Fabian)	Philippines, Ryukyu Islands, Taiwan, China, North Korea				> 25+ million
2021	Tropical Storm	08/11/21	08/20/21	Fred	Lesser Antilles, Greater Antilles, Southern Quebec, The Maritimes				25 million
2021	Hurricane	08/13/21	08/21/21	Grace	Lesser Antilles, Greater Antilles, Yucatan Peninsula, Central Mexico				513 million
2021	Earthquake	08/14/21	08/14/21	Haiti					1 billion
2021	Hurricane	08/26/21	09/04/21	Ida	Venezuela, Colombia, Jamaica, Cayman Islands, Cuba, Atlantic Canada				> 250 million
2021	Earthquake	09/07/21	09/07/21	Guerrero	Mexico				200 million
2021	Earthquake	09/16/21			China				> 25+ million
2021	Hurricane	09/12/21	09/18/21	Nicholas	Yucatan Peninsula, Tamaulipas				1.1 billion

Priority 1 – High priority
Priority 2 – Medium priority
Priority 3 – Low priority

**CAPITAL ADEQUACY (E) TASK FORCE
WORKING AGENDA ITEMS FOR CALENDAR YEAR 2021**

Capital Adequacy (E) Task Force

2021 #	Owner	2021 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
Ongoing Items – Life RBC							
1	Life RBC WG	Ongoing	Ongoing	Make technical corrections to Life RBC instructions, blank and /or methods to provide for consistent treatment among asset types and among the various components of the RBC calculations for a single asset type.			
2	Life RBC WG	1	2021 or later	1.Monitor the impact of the changes to the variable annuities reserve framework and risk-based capital (RBC) calculation and determine if additional revisions need to be made. 2.Develop and recommend appropriate changes including those to improve accuracy and clarity of variable annuity (VA) capital and reserve requirements.	CATF	Being addressed by the Variable Annuities Capital and Reserve (E/A) Subgroup	
3	Life RBC WG	1	2021 or later	Provide recommendations for the appropriate treatment of longevity risk transfers by the new longevity factors.	New Jersey	Being addressed by the Longevity (E/A) Subgroup	
Carry-Over Items Currently being Addressed – Life RBC							
4	Life RBC WG	1	2021 or later	Update the current C-3 Phase I or C-3 Phase II methodology to include indexed annuities with consideration of contingent deferred annuities as well	AAA		
5	Life RBC WG	1	2021 or later	Work with the Life Actuarial (A) Task Force and Conning to develop the economic scenario generator for implementation.			
New Items – Life							
6	Life RBC WG	1	2021	Develop guidance for regulators as it relates to the potential impact of the bond factor changes on 2021 RBC results and the trend test			
7	Life RBC WG	1	2021 or later	Review companies at action levels, including previous years, to determine what drivers of the events are and consider whether changes to the RBC statistics are warranted.			
Carry-Over Items Currently being Addressed – P&C RBC							
8	Cat Risk SG	1	Year-end 2022 or later	Continue development of RBC formula revisions to include a risk charge based on catastrophe model output: a) Evaluate other catastrophe risks for possible inclusion in the charge - determine whether to recommend developing charges for any additional perils, and which perils or perils those should be.	Referral from the Climate and Resiliency Task Force. March 2021	4/26/21 - The SG expose the referral for a 30-day exposure period. 6/1/21 - The SG forwarded the response to the Climate and Resiliency Task Force.	4/26/2021
9	P&C RBC WG	1	Year-end 2020 or later	Evaluate a) the current growth risk methodology whether it is adequately reflects both operational risk and underwriting risk; b) the premium and reserve based growth risk factors either as a stand-alone task or in conjunction with the ongoing underwriting risk factor review with consideration of the operational risk component of excessive growth; c) whether the application of the growth factors to NET proxies adequately accounts for growth risk that is ceded to reinsures that do not trigger growth risk in their own right.	Refer from Operational Risk Subgroup	1) Sent a referral to the Academy on 6/14/18 conference call.	1/25/2018

Priority 1 – High priority
Priority 2 – Medium priority
Priority 3 – Low priority

**CAPITAL ADEQUACY (E) TASK FORCE
WORKING AGENDA ITEMS FOR CALENDAR YEAR 2021**

Capital Adequacy (E) Task Force

2021 #	Owner	2021 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
10	P&C RBC WG	1	2020 Summer Meeting or later	Continue development of RBC formula revisions based on the Covered Agreement: consider whether the factor for uncollateralized, unrated reinsurers, runoff and captive companies should be adjusted		12/5/19 - The WG exposed Proposal 2018-19-P (Vulnerable 6 or unrated risk charge) for a 30-day exposure period. 2/3/20 - The WG adopted Proposal 2018-19-P. However, the WG intended to evaluate the data annually until reaching any agreed upon change to the factor and the structure. 3/15/21 - The WG exposed Proposal 2021-03-P (Credit Risk Instruction Modification) for a 30-day exposure period. 4/27/21 - The WG adopted proposal 2021-03-P. 6/30/21- The CADTF adopted this proposal.	8/4/2018
11	P&C RBC WG	1	Year-end 2021 or later	Evaluate the proposed changes from the Affiliated Investment Ad Hoc Group related to P/C RBC Affiliated Investments			6/10/2019
12	P&C RBC WG	1	2021 Summer Meeting or later	Continue working with the Academy to review the methodology and revise the underwriting (Investment Income Adjustment, Loss Concentration, LOB UW risk) charges in the PRBC formula as appropriate.			6/10/2019
13	Cat Risk SG	1	Year-end 2022 or later	Evaluate the possibility of allowing additional third party models or adjustments to the vendor models to calculate the cat model losses		7/15/21 - The SG is continue evaluating this item.	12/6/2019
14	P&C RBC WG	1	2022 Spring Meeting	Evaluate if changes should be made to the P/C formula to better assess companies in runoff.		1/29/20 - received a referral from the Restructuring Mechanisms (E) WG 4/27/21 - The WG forwarded a response to the Restructuring Mechanism (E) WG.	2/3/2020
15	P&C RBC WG	1	2022 Summer Meeting	Evaluate the Underwriting Risk Line 1 Factors in the P/C formula.			7/30/2020
16	Cat Risk SG	1	2021 Spring Meeting	Modify instructions to PR027 Interrogatories that clarify how insurers with no gross exposure to earthquake or hurricane should complete the interrogatories		10/27/20 - expose the proposal for 30 day comment period 3/8/21 - The SG adopted the proposal 2020-08-CR at the Spring National Meeting. 3/15/21 - The WG adopted this proposal. 3/23/21 - The CADTF adopted this proposal.	10/19/2020
17	P&C RBC WG	1	2022 Summer Meeting	Evaluate R3 Adjustment for Operational Risk Charge			10/27/2020
18	Cat Risk SG	1	2022 Spring Meeting or later	Implement Wildfire Peril in the Reat component (For Informational Purpose Only)		7/15/21 - The SG is continue studying this item.	3/8/2021

Ongoing Items – Health RBC

Priority 1 – High priority
Priority 2 – Medium priority
Priority 3 – Low priority

**CAPITAL ADEQUACY (E) TASK FORCE
WORKING AGENDA ITEMS FOR CALENDAR YEAR 2021**

Capital Adequacy (E) Task Force

2021 #	Owner	2021 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
19	Health RBC WG	Yearly	Yearly	Evaluate the yield of the 6-month U.S. Treasury Bond as of Jan. 1 each year to determine if further modification to the 0.5% adjustment to the Comprehensive Medical, Medicare Supplement and Dental and Vision underwriting risk factors is required. Any adjustments will be rounded up to the nearest 0.5%.	HRBCWG		11/4/2021
20	Health RBC WG	3	Year-end 2022 RBC or later	Evaluate the impact of Federal Health Care Law on the Health RBC Formulas	4/13/2010 CATF Call	Adopted 2014-01H Adopted 2014-02H Adopted 2014-05H Adopted 2014-06H Adopted 2014-24H Adopted 2014-25H Adopted 2016-01-H Adopted 2017-09-CA Adopted 2017-10-H The Working Group will continually evaluate any changes to the health formula as a result of ongoing federal discussions and legislation.	
21	Health RBC WG	3	Year-end 2022 RBC or later	Discuss and monitor the development of federal level programs and actions and the potential impact of these changes to the HRBC formula: - Development of the state reinsurance programs; - Association Health Plans; - Cross-border sales	HRBCWG	Discuss and monitor the development of federal level programs and the potential impact on the HRBC formula.	1/11/2018
Carry-Over Items Currently being Addressed – Health RBC							
22	Health RBC WG	3	Year-End 2023 RBC or Later	Consider changes for stop-loss insurance or reinsurance.	AAA Report at Dec. 2006 Meeting	(Based on Academy report expected to be received at YE-2016) 2016-17-CA	
23	Health RBC WG	2	Year-end 2023 RBC or later	Review the individual factors for each health care receivables line within the Credit Risk H3 component of the RBC formula.	HRBC WG	Adopted 2016-06-H Rejected 2019-04-H Annual Statement Guidance (Year-End 2020) and Annual Statement Blanks Proposal (Year-End 2021) referred to the Blanks (E) Working Group	
24	Health RBC WG	1	Year-end 2022 or later	Establish an Ad Hoc Group to review the Health Test and annual statement changes for reporting health business in the Life and P/C Blanks	HRBCWG	Evaluate the applicability of the current Health Test in the Annual Statement instructions in today's health insurance market. Discuss ways to gather additional information for health business reported in other blanks.	8/4/2018
25	Health RBC WG	1	Year-end 2022 RBC or later	Review the Managed Care Credit calculation in the Health RBC formula - specifically Category 2a and 2b. Review Managed Care Credit across formulas.	HRBCWG	Review the Managed Care Category and the credit calculated, more specifically the credit calculated when moving from Category 0 & 1 to 2a and 2b.	12/3/2018
26	Health RBC WG	1	Year-end 2022 or later	Review referral letter from the Operational Risk (E) Subgroup on the excessive growth charge and the development of an Ad Hoc group to charge.	HRBCWG	Review if changes are required to the Health RBC Formula	4/7/2019

Priority 1 – High priority
Priority 2 – Medium priority
Priority 3 – Low priority

**CAPITAL ADEQUACY (E) TASK FORCE
WORKING AGENDA ITEMS FOR CALENDAR YEAR 2021**

Capital Adequacy (E) Task Force

2021 #	Owner	2021 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
27	Health RBC WG	1	Year-End 2022 or later	Consider impact of COVID-19 and pandemic risk in the Health RBC formula.	HRBCWG		7/30/2020
28	Health RBC WG	1	Year-End 2021 or later	Work with the Academy to evaluate incorporating and including investment income in the Underwriting Risk component of the Health RBC formula. * Develop a process for reviewing investment income in the underwriting risk factors. * Determine the frequency for which the adjustment should be updated. * Determine if other lines of business should include investment income.	HRBCWG	Referral Letter was sent to the Academy on Sept 21. - Adopted 5/25/21 by the WG	8/18/2020
29	Health RBC WG	4 3	2024 Year-End 2023 or later	Discuss and determine the bond factors for the 20 designations.	Referral from Investment RBC July/2020	Working Group will use two- and five-year time horizon factors in 2020 impact analysis. Proposal 2021-09-H - Adopted 5/25/21 by the WG	9/11/2020
New Items – Health RBC							
30	Health RBC WG	1	Year-End 2022 or later	Work with the Academy to perform a comprehensive review of the H2 - Underwriting Risk component of the Health RBC formula including the Managed Care Credit review (Item 18 above)	HRBCWG		4/23/2021
New Items – Task Force							
Ongoing Items – Task Force							
31	CADTF	2	2022	Affiliated Investment Subsidiaries Referral Ad Hoc group formed Sept. 2016	Ad Hoc Group		
Carry-Over Items not Currently being Addressed – Task Force							
32	CADTF	2	2022 or Later	Supplementary Investment Risks Interrogatories (SIRI)	Referral from Blackrock and IL DOI	The Task Force received the referral on Oct. 27. This referral will be tabled until the bond factors have been adopted and the TF will conduct a holistic review all investment referrals.	11/19/2020
33	CADTF	3	2021	Receivable for Securities factor		Consider evaluating the factor every 3 years. (2021, 2024, 2027, etc.) Factors are exposed for comment. Comments due May 28, 2021 for consideration on June 30th. Factors Adopted for 2021.	
34	CADTF	2	2022 or Later	NAIC Designation for Schedule D, Part 2 Section 2 - Common Stocks Equity investments that have an underlying bond characteristic should have a lower RBC charge? Similar to existing guidance for SVO-identified ETFs reported on Schedule D-1, are treated as bonds.	Referral from SAPWG 8/13/2018	10/8/19 - Exposed for a 30-day Comment period ending 11/8/2019 3-22-20 - Tabled discussion pending adoption of the bond structure and factors.	10/11/2018
35	CADTF	2	2022 or Later	Structured Notes - defined as an investment that is structured to resemble a debt instrument, where the contractual amount of the instrument to be paid at maturity is at risk for other than the failure of the borrower to pay the contractual amount due. Structured notes reflect derivative instruments (i.e. put option or forward contract) that are wrapped by a debt structure.	Referral from SAPWG April 16, 2019	10/8/19 - Exposed for a 30-day Comment period ending 11/8/2019 3-22-20 - Tabled discussion pending adoption of the bond structure and factors.	8/4/2019

Priority 1 – High priority
 Priority 2 – Medium priority
 Priority 3 – Low priority

**CAPITAL ADEQUACY (E) TASK FORCE
 WORKING AGENDA ITEMS FOR CALENDAR YEAR 2021**

Capital Adequacy (E) Task Force

2021 #	Owner	2021 Priority	Expected Completion Date	Working Agenda Item	Source	Comments	Date Added to Agenda
36	CADTF	2	2022 or Later	Comprehensive Fund Review for investments reported on Schedule D Pt 2 Sn2	Referral from VOSTF 9/21/2018	Discussed during Spring Mtg. NAIC staff to do analysis. 10/8/19 - Exposed for a 30-day comment period ending 11/8/19 3-22-20 - Tabled discussion pending adoption of the bond structure and factors.	11/16/2018

Carry-Over Items Currently being Addressed – Task Force

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