2019 Summer National Meeting

Casualty Actuarial and Statistical (C) Task Force

August 3, 2019

New York, New York
2019 Summer National Meeting
New York, New York

CASUALTY ACTUARIAL AND STATISTICAL (C) TASK FORCE
Saturday, August 3, 2019
9:30 – 11:30 a.m.
New York Hilton Midtown—Mercury Ballroom—3rd Level

ROLL CALL

Steve Kelley, Chair                Minnesota    Anita G. Fox                Michigan
James J. Donelon, Vice Chair      Louisiana    Chloro Lindley-Myers        Missouri
Jim L. Ridling                    Alabama      Barbara D. Richardson      Nevada
Lori K. Wing-Heier               Alaska        Marlene Caride             New Jersey
Keith Schraad                     Arizona      John G. Franchini          New Mexico
Ricardo Lara                     California    Mike Causey                North Carolina
Michael Conway                   Colorado     Jillian Froment           Ohio
Andrew N. Mais                   Connecticut  Glen Mulready             Oklahoma
Stephen C. Taylor                District of Columbia Andrew Stolfi Oregon
David Altmayer                    Florida      Jessica Altman            Pennsylvania
Colin M. Hayashida                Hawaii       Raymond G. Farmer         South Carolina
Robert H. Muriel                  Illinois     Kent Sullivan              Texas
Doug Ommen                        Iowa         Mike Kreidler             Washington
Vicki Schmidt                    Kansas        James A. Dodrill          West Virginia
Eric A. Cioppa                    Maine

NAIC Support Staff: Kris DeFrain/Jennifer Gardner

AGENDA

1. Consider Adoption of its July 9, June 11, May 14 and 2019 Spring National Meeting Minutes—Phillip Vigliaturo (MN) Attachment One

2. Consider Adoption of its Working Group Reports—Phillip Vigliaturo (MN) Attachment Two
   a. Actuarial Opinion (C) Working Group—Julie Lederer (MO)
   b. Statistical Data (C) Working Group—Carl Sornson (NJ)

3. Discuss the Predictive Analytics White Paper—Rich Piazza (LA) Attachment Three

4. Consider a Response to the CAS/ Discuss CAS/ SOA Task Force’s Appointed Actuary Continuing Education Verification Process and Comments Received—Kevin Dyke (MI) Attachment Four

5. Discuss NAIC Activities Regarding Casualty Actuarial Issues—Phillip Vigliaturo (MN)
   a. Report Status of Loss Portfolio Transfer Letter from the American Academy of Actuaries—Phil Vigliaturo (MN)
   b. Property and Casualty Insurance (C) Committee: “NAIC-Accepted Actuarial Designation”

6. Hear Reports from Actuarial Organizations

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b. Academy’s Council on Professionalism—Shawna Ackerman (Academy), Godfrey Perrott (Actuarial Board for Counseling and Discipline—ABCD) and Kathleen A. Riley (Actuarial Standards Board—ASB)

c. Society of Actuaries (SOA) General Insurance Actuarial Research and Education Update —Dale Hall (SOA)

d. Casualty Actuarial Society (CAS) Property/Casualty Actuarial Research —Ralph Blanchard (CAS)

7. Discuss Any Other Matters Brought Before the Task Force—Phillip Vigliaturo (MN)

8. Adjournment

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Attachment One

Consider Adoption of its July 9, 2019; June 11, 2019; May 14, 2019; and 2019 Spring National Meeting Minutes
The Casualty Actuarial and Statistical (C) Task Force met met via conference call July 9, 2019. The following Task Force members participated: Steve Kelley, Chair, represented by Phil Vigliaturo (MN); James J. Donelon, Vice Chair, represented by Rich Piazza and Larry Steinert (LA); Lori K. Wing-Heier represented by Michael Ricker (AK); Jim L. Ridling represented by Daniel Davis and Jerry Workman (AL); Keith Schraad represented by Vanessa Darrah and Tom Zuppan (AZ); Ricardo Lara represented by Giovanni Muzzarelli and Mitra Sanandajifar (CA); Michael Conway represented by Mitchell Bronson and Sydney Sloan (CO); Andrew N. Mais represented by Qing He and Wanchin Chou (CT); Stephen C. Taylor represented by Monica Dyson (DC); David Altmairer represented by Jie Cheng, Greg Jaynes and Robert Lee (FL); Colin M. Hayashida represented by Randy Jacobson (HI); Doug Ommen represented by Travis Grassel (IA); Robert H. Muriel represented by Reid McClintock and Judy Mottar (IL); Vicki Schmidt represented by Nicole Boyd and Heather Droge (KS); Eric A. Cioppa represented by Sandra Darby (ME); Chlora Lindley-Myers represented by Kendra Fox, Julie Lederer and Anthony Senevey (MO); Marlene Caride represented by Carl Sornson (NJ); John G. Franchini represented by Anna Krylova (NM); Barbara D. Richardson represented by Gennady Stolyarov (NV); Jillian Froment represented by Tom Botsko and Mark Hamlin (OH); Glen Mulready represented by Nicolas Lopez, Andrew Schallhorn and Kate Yang (OK); Andrew Stolfi represented by David Dahl and Ying Liu (OR); Jessica Altman represented by Kevin Clark, Michael McKenney and James DiSanto (PA); Raymond G. Farmer represented by Will Davis, (SC); Kent Sullivan represented by J’ne Byckovski, Brock Childs, Nicole Elliott, Miriam Fisk, Eric Hintikka, Elizabeth Howland, Walt Richards, Brian Ryder and Bethany Sims (TX); and Mike Kreidler represented by Eric Slavich (WA). Also participating was: Gordon Hay (NE); and Tomasz Serbinowski (UT).

1. Received a Report from the Actuarial Opinion (C) Working Group

Ms. Lederer said the Actuarial Opinion (C) Working Group met numerous times via conference call and adopted on May 29 a response to a referral from the Financial Examiners Handbook (E) Technical Group regarding the Examination Repository for Reserves/Claims Handling (P/C). She said adoption was not unanimous. The Technical Group will expose a proposal in August or September to provide another opportunity for comment.

Ms. Lederer said the draft Regulatory Guidance on Property and Casualty Statutory Statements of Actuarial Opinion (Regulatory Guidance) document for 2019 contains guidance on actuarial qualification documentation to align with proposed changes to the 2019 Statement of Actuarial Opinion (SAO) instructions. The document was exposed for a public comment period ending July 8.

The Working Group met June 25 and June 18 via conference call in regulator-to-regulator session, pursuant to paragraph 3 (specific companies, entities or individuals) of the NAIC Policy Statement on Open Meetings, to discuss actuarial responsibilities in the financial examination process. The Working Group agreed to meet in the future via conference call in regulator-to-regulator session to continue discussion on this topic. On June 25, the Working Group held its annual discussion about Statements of Actuarial Opinion.

2. Received a Report from the Statistical Data (C) Working Group

Mr. Sornson said the Statistical Data (C) Working Group has not met this spring. However, he said an ad hoc group is working on changes to the formulas in the Report on Profitability by Line by State (Profitability Report). He said three changes are proposed that could result in some minor changes to the numbers. The Working Group is checking variances from prior years on submitted homeowners’ data and is expecting auto data soon.


Mr. Vigliaturo said the Task Force received several comments from its exposure of the predictive analytics white paper, with comments due June 28 (Attachments __). Mr. Piazza said the comments are more detailed and will be helpful in the redrafting of the paper. Those who submitted written comments were given the opportunity to present their comments verbally. Additional discussion occurred, expanding on the submitted comments. State insurance regulators’ comments included the following: 1) industry should provide a plausible or intuitive explanation for why a risk characteristic should be used; 2) insurers...
do not have to show causality; 3) the lack of an intuitive answer does not necessarily mean state insurance regulators will not allow such use; 4) actuarial standards may be outdated for today’s needs; 5) Nevada law states that risks may be classified in any “reasonable way” and cannot be based on certain listed characteristics; and 6) the white paper will be provided to states to provide advice but not to require any particular state actions.

Industry representatives made the following additional comments: 1) a risk classification might not always be intuitive; 2) flexibility is needed because insurers are developing a plan for future risk given rating plans are being developed for the future; and 3) actuarial standards should be applied and the standards should be the same for a rate filing with or without a model.

Consumer advocate oral comments included the following: 1) a state insurance regulator’s job is to enforce laws, and actuarial standards are not laws; 2) state insurance regulators should identify best practices under given current resources, but also identify best practices with identification of the resources needed; 3) state insurance regulators have no authority under current laws to require an intuitive explanation if there is a statistical relationship; however, they have the ability to question whether the statistical relationship is spurious or real; and 4) statistical relationship should also be conclusive evidence that unfair discrimination is taking place.

Mr. Piazza said the drafting group will review comments, redraft the current sections of the white paper and add some missing sections (e.g., definitions, guidance to state insurance regulators, the handbook section). He said the white paper should be re-exposed at or shortly after the Summer National Meeting.

4. **Heard a Report on the Status of 2019 SAO Instructions**

During its June 11 conference call, the Task Force made a significant change to its actuarial opinion instruction proposal (to describe the qualification documentation as workpapers rather than as part of the Actuarial Report) and then adopted its amended proposal.

Ms. DeFrain said the ad hoc group of insurance commissioners made some changes to its proposed SAO instructions based upon the comments submitted in May (Attachments __). She described the changes made by the ad hoc group. The proposal was submitted to the Executive (EX) Committee, adopted during the June 25 Executive (EX) Committee meeting and submitted to the Blanks (E) Working Group.

Ms. DeFrain discussed the blanks proposal, which includes the changes made by the ad hoc group, documentation of the project and reasons for change. She said that a table of exam substitutions was added and that the Casualty Actuarial Society (CAS) and Society of Actuaries (SOA) were involved in the development of the wording for that table and introductory comments to the table. She said the new table also allowed for elimination of a separate grandfathering clause. She said the Blanks (E) Working Group exposed the proposal, and comments are due by July 24.

Craig Hanna (American Academy of Actuaries—Academy) asked if the Executive (EX) Committee was open. Ms. DeFrain said the meeting was regulator-to-regulator. Mr. Hanna asked if there had been any opportunity for comment, and Ms. DeFrain said there was a public hearing and numerous opportunities for written comment.

Mr. Chen said he made a comment at the Executive (EX) Committee meeting about a requirement for Academy membership. He said several states supported that. He asked whether those comments were incorporated into the proposal. Ms. DeFrain said the Executive (EX) Committee made no changes to the proposal and approved it for submission to the Blanks (E) Working Group. Mr. Chen said he expected further discussion of the issue. Ms. DeFrain agreed, saying further discussion will depend on the submission of comments.

Ralph Blanchard (Travelers) said the Blanks (E) Working Group recently adopted new procedures and will no longer be meeting in person at the national meetings.

5. **Discussed the CAS/SOA Task Force’s Appointed Actuary CE Verification Process**

Mr. Vigliaturo said during its June 11 conference call, the Task Force briefly discussed the joint CAS/SOA Task Force’s project to verify continuing education (CE). The Task Force was asked to assist the joint CAS/SOA Task Force in its identification of useful categorization of the CE to evaluate, especially to ensure that Appointed Actuaries are indeed getting 15 hours of CE
related to the Appointed Actuary work. The joint CAS/SOA Task Force’s proposal identifies proposed categorization. The Task Force is asked to evaluate the data collection categories.

Ann Weber (SOA) said the joint CAS/SOA Task Force is seeking feedback from state insurance regulators on the proposed categories to evaluate hours for an Appointed Actuary tied to the actuarial opinion requirements. Mr. Blanchard said there are some issues with the proposal. One is that an Appointed Actuary can be qualified under the Academy exception, and that person would not be included in this plan.

6. **Reported the Status of the Academy’s Loss Portfolio Transfer Letter**

Mr. Vigliaturo said the Academy’s Committee on Property and Liability Financial Reporting (COPLFR) submitted a letter discussed during the Task Force’s June 11 conference call. The letter identifies ambiguities in guidance for reporting portfolio retroactive reinsurance or loss portfolio transfer. COPLFR offers several suggestions for clarifying the relevant instructions. The Task Force is awaiting a project plan from the Statutory Accounting Principles (E) Working Group.

Mr. Hay said loss portfolio transfers are becoming more common, so this is a timely issue. He said he has many questions arising from review of the letter.

7. **Discussed Upcoming Activities**

Mr. Vigliaturo informed the Task Force about the following events: 1) a July 16 regulator-to-regulator conference call to discuss rate filing issues; and 2) a July 23 Predictive Analytics Book Club conference call to discuss a soon-to-be-selected paper.

Having no further business, the Casualty Actuarial and Statistical (C) Task Force adjourned.
The Casualty Actuarial and Statistical (C) Task Force met via conference call June 11, 2019. The following Task Force members participated: Steve Kelley, Chair, represented by Phil Vigliaturo (MN); James J. Donelon, Vice Chair, represented by Rich Piazza and Larry Steinert (LA); Lori K. Wing-Heier represented by Michael Ricker (AK); Jim L. Ridling represented by Daniel Davis and Jerry Workman (AL); Ricardo Lara represented by Giovanni Muzzarelli, Mitra Sanandajifar and Lynne Wehmuller (CA); Michael Conway represented by Mitchell Bronson, Rolf Kaumann and Sydney Sloan (CO); Andrew N. Maiz represented by Susan Gozzo Andrews, Qing He and Wanchin Chou (CT); David Altmaier represented by Howard Eagelfeld (FL); Doug Ommen represented by Travis Grassel and Andrea Seip (IA); Robert H. Muriel represented by Judy Mottar (IL); Vicki Schmidt represented by Nicole Boyd (KS); Eric A. Cioppa represented by Sandra Darby (ME); Anita G. Fox represented by Kevin Dyke (MI); Chlora Lindley-Myers represented by Julie Lederer (MO); Marlene Caride represented by Mark McGill and Carl Sornson (NJ); John G. Franchini represented by Anna Krylova (NM); Barbara D. Richardson represented by Gennady Stolyarov (NV); Jillian Froment represented by Tom Botsko (OH); Glen Mulready represented by Nicolas Lopez, Andrew Schallhorn and Kate Yang (OK); Andrew Stolfi represented by David Dahl and Ying Liu (OR); Jessica Altman represented by Kevin Clark and Michael McKenney (PA); Raymond G. Farmer represented by Will Davis, Darien Porter and Michael Wise (SC); Kent Sullivan represented by J'ne Byckovski, Brock Childs, Miriam Fisk, Eric Hintikka and Elizabeth Howland (TX); and Mike Kreidler represented by Eric Slavich (WA).

1. Adopted Qualification Documentation Instructions for Inclusion in the 2019 SAO Instructions

Mr. Vigliaturo said the Task Force and the ad hoc group of insurance commissioners from the Executive (EX) Committee jointly exposed the revised Statement of Actuarial Opinion (SAO) instructions for a 30-day public comment period ending May 31. Several comment letters were received (Attachment __). The Task Force discussed the comments about qualification documentation and staff recommendations in response to the comments (Attachment __).

Ms. Lederer said comments submitted by Lisa Slotznick (PricewaterhouseCoopers—PwC) will be reviewed by the Actuarial Opinion (C) Working Group and addressed in the Regulatory Guidance document, as needed.

In light of Connecticut’s submitted comments, the Task Force discussed where the detailed qualification documentation should be maintained. Kris DeFrain (NAIC) said the original proposal was to include the qualification documentation as part of the Actuarial Report, which provided confidentiality of the documentation, stated how long the documentation must be held for regulatory review, stated when it was due, etc. Mr. Stolyarov suggested the Task Force address confidentiality and leave the due date and other decisions to the individual state. He said he would be requesting the most recent version if he were to review the documentation. Ms. Mottar said she would want to see the qualification documentation for the period of review.

Mr. Piazza made a motion, seconded by Mr. Will Davis, to remove the qualification documentation from the Actuarial Report. Mr. Piazza requested a roll call vote. The motion passed 11-8, with four abstentions. The following states voted no: Alabama, Colorado, Florida, Illinois, Louisiana, Missouri, New Mexico and Texas. The following states abstained: Kansas, Maine, New Jersey, and Oklahoma. A vote by the Task Force chair was not needed.

Ms. Lederer said her comments assumed the qualification documentation would be housed in the Actuarial Report. With the change in that requirement, she said her comments are no longer applicable.

Ms. DeFrain said the other comments addressing issues other than qualification documentation will be sent to the ad hoc group for consideration. She said the ad hoc group will present its proposal to the Executive (EX) Committee for its June 25 meeting. Ms. Andrews and Shawna Ackerman (American Academy of Actuaries—Academy) expressed support for requiring Academy membership. Mary Downs (Academy) said the process of discussion on the other issues is not an opinion process, and it is not transparent how the decision is being made and who is making it.

Mr. Gennady suggested the phrasing around the qualification documentation should be broad. He said the qualification documentation should be available at the state insurance regulator’s request in a time frame and manner determined at the regulator’s discretion.
Mr. Dyke proposed the qualification documentation be labeled as workpapers: “The qualification documentation shall be considered workpapers and be available for inspection upon regulator request or during a financial examination.” He said that would address the confidentiality concern according to the model law. Ms. Lederer said Missouri law has the same wording about workpaper confidentiality. The Task Force agreed with Mr. Dyke’s suggested wording.

Mr. Dyke made a motion, seconded by Mr. Chou, to adopt the qualification documentation instructions as revised. The motion passed unanimously.

2. Received a Loss Portfolio Transfer Letter from the Academy

Mr. Vigliaturo said the Academy’s Committee on Property and Liability Financial Reporting (COPLFR) submitted a letter dated May 21, 2019, that pointed out ambiguities of guidance for reporting loss portfolio retroactive reinsurance and loss portfolio transfers. He said the letter was also addressed to the Statutory Accounting Principles (E) Working Group, which will add the letter to its agenda at the Summer National Meeting. The Task Force will await a decision on how to proceed from the Working Group.

Kathy Odomirok (Academy) said COPLFR provided examples but did not make recommendations on how to resolve the issue. Ralph Blanchard (Travelers) said the issue is not about how professional reinsurance codes the transaction, but rather about how companies code this when they cede the business. He said there may be distortion in risk-based capital (RBC) and Schedule P.


Mr. Piazza said the second draft of the white paper is currently exposed for a 45-day public comment period ending June 28, with written comments due to Ms. DeFrain. Mr. Piazza requested that commenters propose alternative wording if the current wording seems unacceptable. He said the drafters will continue to work on the additional sections of the paper in preparation of the third exposure of the paper sometime this summer. Mr. Vigliaturo said if specific comments are already shown in the drafters’ documentation as having been addressed, he requested the same comment not be resubmitted.

Having no further business, the Casualty Actuarial and Statistical (C) Task Force adjourned.

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The Casualty Actuarial and Statistical (C) Task Force met via conference call May 14, 2019. The following Task Force members participated: Steve Kelley, Chair, represented by Phillip Vigliaturo (MN); James J. Donelon, Vice Chair, represented by Rich Piazza and Lawrence Steinert (LA); Lori K. Wing-Heier represented by Mike Ricker (AK); Jim L. Ridling represented by Daniel J. Davis (AL); Keith Schraad represented by Vincent Gosz and Brooke Lovallo (AZ); Ricardo Lara represented by Mitra Sanandajifar and Lynne Wehmueller (CA); Michael Conway represented by Mitchell Bronson, Rolf Kaumann and Sydney Sloan (CO); Andrew N. Mais represented by Susan Andrews, Qing He and Wanchin Chou (CT); Stephen C. Taylor represented by David Christholf (DC); David Altmaier represented by Robert Lee (FL); Doug Ommen represented by Travis Grassel and Andria Seip (IA); Robert H. Muriel represented by Reid McClintock and Judy Mottar (IL); Vicki Schmidt represented by Nicole Boyd (KS); Eric A. Cioppa represented by Sandra Darby and Alex Nitin (ME); Anita G. Fox represented by Kevin Dyke (MI); Chlora Lindley-Myers represented by Gina Clark and Julie Lederer (MO); Marlene Caride represented by Mark McGill and Carl Sornson (NJ); John G. Franchini represented by Anna Krylova (NM); Barbara D. Richardson represented by Gennady Stolyarov (NV); Jillian Froment represented by Tom Botsko (OH); Andrew Stolfi represented by David Dahl and Ying Liu (OR); Jessica Altman represented by Kevin Clark and James DiSanto (PA); Raymond G. Farmer represented by Will Davis, Daniel Porter and Michael Wise (SC); Kent Sullivan represented by J’ne Byckovski, Brock Childs, Miriam Fisk, Eric Hintikka, Elizabeth Howland and Bethany Sims (TX); Mike Kreidler represented by Eric Slavich (WA); and James A. Dodrill represented by Joylynn Fix (WV).

1. **Received a Report from the Actuarial Opinion (C) Working Group**

Ms. Lederer said the Actuarial Opinion (C) Working Group is responding to a referral from the Financial Examiners Handbook (E) Technical Group regarding the “Reserves and Claims Handling Exam Repositories (P&C).” The referral response is due May 31.

The Working Group is beginning work on the regulatory guidance for 2019 actuarial opinions.

2. **Received a Report from the Statistical Data (C) Working Group**

Mr. McGill said the Statistical Data (C) Working Group continues to review the formulas in the *Report on Profitability by Line by State* (Profitability Report). The Working Group is also gathering and checking data for the auto and homeowners reports. The Working Group will address the issue presented by Mr. Lee on the prior Task Force call.

3. **Exposed the CAS/SOA Task Force’s Appointed Actuary CE Verification Process**

Mr. Piazza provided some background. He said the NAIC’s consultant hired to review the actuarial educational and qualification systems for property/casualty (P/C) actuaries had multiple recommendations, three of which were assigned to the Task Force. He said the “attestation charge” and the “3-year experience charge” proposals are nearing completion, with the proposed qualification documentation changes to be added to the Statement of Actuarial Opinion instructions.

Mr. Piazza said the third charge is to establish requirements for continued competence. In 2018, the Casualty Actuarial Society (CAS) and Society of Actuaries (SOA) jointly proposed a plan and received the Task Force’s approval. The plan includes the following CAS and SOA actions: 1) publicly disclose the names of members who attest to meeting the continuing education (CE) requirements; 2) annually audit a percentage of attesting members; 3) send the Task Force a report explaining how the CE requirements were generally met; and 4) work with the NAIC in 2019 to identify whether the P/C Appointed Actuaries’ logs of CE should contain any particular categorization to assist regulatory review, what types of learning P/C Appointed Actuaries are using to meet CE requirements for “Specific Qualification Standards” today, and whether more specificity should be added to the P/C Appointed Actuaries’ CE requirements to ensure CE is aligned with the educational needs for a P/C Appointed Actuary.

Mr. Piazza said the American Academy of Actuaries (Academy) was asked to participate in this work but declined the invitation. He said the Task Force’s interest at this time is only on the CE requirements for P/C Appointed Actuaries so that state insurance regulators will be able to evaluate whether Appointed Actuaries do indeed meet qualification requirements.

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Mr. Dyke described the next step in the CAS/SOA Task Force’s proposed plans. He said the Task Force is asked to identify the categorization of CE the Task Force wants to see to make sure appointed actuaries are indeed getting 15 hours of CE related to the appointed actuary work. At a high level, categorization would be enough to identify whether CE includes items such as reserving techniques, evaluation of risks related to loss reserves at a company, or any subject that could or does relate to a particular Statement of Actuarial Opinion. The CAS and SOA submitted a proposal that identifies a proposed categorization. He requested feedback on the level of detail of the categorization.

Mr. Dyke said the Task Force will need enough information to be able to do the other items in the charge: to review the CE being taken today and determine whether specificity should be added to the Statement of Actuarial Opinion instructions and/or the Academy’s qualification standards. Overall, state insurance regulators need to make sure that Appointed Actuaries are indeed getting their CE requirements and doing so to keep up their level of expertise. A main focus of this project is to evaluate whether Appointed Actuaries are keeping up their skills in light of new research and techniques being added to the basic education syllabi each year. He said other parts of the proposal are important, too, but categorization is the first priority.

Mr. Stolyarov said the focus is on how the CE meets the specific CE requirements in the *U.S. Qualification Standards*. He said the general CE requirements may or may not count for specific requirements. He suggested allowing a category of “other” and an area to explain why the particular CE would count for general and/or specific CE requirements. He requested a public attestation form.

Mr. Dyke said the form in the qualification standards is a starting point for the CAS and SOA. He said the CAS and SOA intends the reporting to be consistent with *U.S. Qualification Standards*. He said a CE credit can be identified as meeting either or both general and specific qualification standards. He said the actuarial association would conduct the audit, not the NAIC. The actuarial associations would provide a report to the NAIC.

Mr. Dyke said this work is not about creating an enforcement mechanism. He said the organizations are collecting this information to better gauge the types of CE individuals are attaining. The audit is akin to the current audits already being conducted to ensure the minimum hours of CE are being met and the CE is appropriate. At this point, the project is a data-collection exercise. He said the organizations may start to get questions about the categorization and may need to refine the categories.

The Task Force agreed to expose the proposal (Attachment ___) for a 24-day public comment period ending June 7, with comments to be submitted to Kris DeFrain (NAIC).

Mr. Piazza requested attention to the categorization, but comments are not limited. The short comment period was established so the Task Force can discuss comments on its June 11 conference call. Mr. Dyke said he did not expect this to be controversial.


Mr. Piazza said documents were distributed to describe the action proposed on individual comments and a revised paper. Mr. Piazza said the changes made to the white paper are shown in the individual comments document, but the revised white paper document does not contain tracked changes.

The Task Force agreed to expose the comment document (Attachment ___) and the revised white paper (Attachment ___) for a 45-day public comment period ending June 28, with written comments due to Ms. DeFrain.

Mr. Piazza requested that commenters propose alternative wording if the current wording seems unacceptable.

5. Discussed the Statement of Actuarial Opinion Instructions

As was previously distributed May 1, the Task Force and the ad hoc group of commissioners from the Executive (EX) Committee exposed the revised Statement of Actuarial Opinion instructions for a 30-day public comment period ending May 31. Ms. DeFrain said the Task Force will be asked to consider submitted comments and consider adoption of its qualification documentation proposal during its June 11 conference call.
Mr. Stolyarov suggested the grandfathering provision should include recognition of fairly equivalent examinations produced by another actuarial associations different from where the actuary received his or her actuarial designation. He said he would submit written comments.

6. Discussed Upcoming Activities

Mr. Piazza informed the Task Force about the following events: 1) May 21 – regulator-to-regulator conference call to discuss rate issues; 2) May 28 – Predictive Analytics Book Club presentation, “Clustering 101 for Insurance Applications,” presented by Linda Brobeck (Pinnacle Actuarial Resources) with a new speaking partner, Greg Frankowiak (Pinnacle Actuarial Resources); 3) June 6 – predictive modeling training, to include technical presentations on the use of predictive analytics in P/C rate filings, at the NAIC/NIPR Insurance Summit; 4) June 7 – regulator-to-regulator training, to include case studies and discussion about the review of predictive analytics in P/C rate filings, at the NAIC/NIPR Insurance Summit.

Having no further business, the Casualty Actuarial and Statistical (C) Task Force adjourned.
The Casualty Actuarial and Statistical (C) Task Force met in Orlando, FL, April 6, 2019. The following Task Force members participated: Steve Kelley, Chair, represented by Phil Vigliaturo (MN); James J. Donelon, Vice Chair, represented by Rich Piazza (LA); Lori K. Wing-Heier represented by Michael Ricker (AK); Keith Schraad represented by Erin Klug (AZ); Ricardo Lara represented by Lynne Wehmueller (CA); Andrew N. Mais represented by Wanchin Chou (CT); Stephen C. Taylor represented by David Christhilf (DC); David Altmaier represented by Sandra Starnes (FL); Colin M. Hayashida represented by Gerald Hew (HI); Doug Ommen represented by Travis Grassel and Andria Seip (IA); Robert H. Muriel represented by Judy Mottar (IL); Vicki Schmidt represented by Nicole Boyd (KS); Eric A. Cioppa represented by Sandra Darby (ME); Anita G. Fox represented by Kevin Dyke (MI); Chlora Lindley-Myers represented by Cynthia Amann (MO); Mike Causey represented by Kevin Conley (NC); Marlene Caride represented by Mark McGill (NJ); Barbara D. Richardson represented by Stephanie Mcgee (NV); Jillian Froment represented by Thomas Botisko (OH); Glen Mulready represented by Andy Schllhorn (OK); Andrew Stolfi represented by TK Keen (OR); Jessica Altman represented by Michael McKenney (PA); Raymond G. Farmer represented by Michael Wise (SC); Kent Sullivan represented by J’ne Byckovski (TX); and Mike Kreidler represented by Eric Slavich (WA).

1. **Adopted its March 22, 2019; March 12, 2019; Feb. 12, 2019; Jan. 29, 2019; Jan. 8, 2019; Dec. 18, 2018; and 2018 Fall National Meeting Minutes**

Mr. Vigliaturo said the Task Force met March 22, 2019; March 12, 2019; Feb. 12, 2019; Jan. 29, 2019; Jan. 8, 2019; and Dec. 18, 2018. During these meetings, the Task Force took the following action: 1) adopted statistical reports; and 2) adopted a comment letter to the Executive (EX) Committee’s ad hoc group regarding the Statement of Actuarial Opinion instructions related to the definition of Qualified Actuary.

The Task Force also met March 19, 2019, in regulator-to-regulator session, pursuant to paragraph 3 (specific companies, entities or individuals) of the NAIC Policy Statement on Open Meetings, to discuss rate filing issues.

The Task Force viewed a Casualty Actuarial Society (CAS) livestreaming event March 26, 2019, in lieu of its typical Predictive Analytics Book Club conference call. The CAS provided access to its livestreaming event from its Ratemaking, Product and Modeling (RPM) Seminar, which included the following sessions: Machine Learning and Artificial Intelligence; The Predictive Modeling Cooking Show; The Changing Role of the Actuary in the Face of Disruption; Insurance Claims Prevention Using New Predictive Analytics; and Auto Insurance: What Happened and What Happens Next?

Mr. Dyke made a motion, seconded by Mr. Piazza, to adopt the Task Force’s March 22, 2019 (Attachment One); March 12, 2019 (Attachment Two); Feb. 12, 2019 (Attachment Three); Jan. 29, 2019 (Attachment Four); Jan. 8, 2019 (Attachment Five); Dec. 18, 2018 (Attachment Six); and Nov. 15, 2018 (see NAIC Proceedings – Fall 2018, Casualty Actuarial and Statistical (C) Task Force) minutes. The motion passed unanimously.

2. **Adopted the Report of the Actuarial Opinion (C) Working Group**

Mr. Vigliaturo said Julie Lederer (MO) provided a written report for the Actuarial Opinion (C) Working Group. The Working Group has not met in 2019. In mid-March, the Financial Examiners Handbook (E) Technical Group asked the Working Group to review the property/casualty (P/C) reserves and claims handling exam repository and provide feedback by May 31.

Mr. Vigliaturo appointed Anna Krylova (NM) as vice chair of the Working Group.

Ms. Mottar made a motion, seconded by Mr. Botisko, to adopt the report of the Actuarial Opinion (C) Working Group. The motion passed unanimously.
Draft Pending Adoption

3. **Adopted the Report of the Statistical Data (C) Working Group**

Mr. McGill said the Statistical Data (C) Working Group is working on the formulas in the *Report on Profitability by Line by State*, primarily regarding allocation of investment gain.

Mr. Piazza made a motion, seconded by Mr. Botsko, to adopt the report of the Statistical Data (C) Working Group. The motion passed unanimously.

4. **Discussed the Appointed Actuary Attestation of Qualification and the Three-Year Experience Requirement Proposals**

Mr. Vigliaturo said there was discussion during the March 22 hearing with the Executive (EX) Committee’s ad hoc group about the Statement of Actuarial Opinion instructions, written comments received and distributed edits. He said the changes the Task Force needs to consider for adoption relate to the attestation and experience charges. He said the other changes will be decided by the ad hoc group.

The Task Force discussed the need to review its proposed changes within a document showing all proposed changes, whether the qualification documentation should include specific reference to companies’ insurance lines and scope of business, additional information to be included in instructions and/or in the annual regulatory guidance, and a concern about potentially rushing the project with lower quality instructions. The Task Force decided to meet via conference call in regulator-to-regulator session to consult with NAIC staff in order to gain a better understanding of how the Task Force’s proposed instructions fit with the ad hoc group’s proposed instructions.

5. **Discussed the Predictive Analytics White Paper**

Mr. Piazza said the white paper was exposed for a 60-day public comment period ending Feb. 12. That exposure period was then extended another week until Feb. 19. The Task Force held two discussions during its Feb. 12 and March 12 conference calls. Following those calls, volunteer drafters mapped the comments to paragraphs of the paper to aid evaluation.

Mr. Piazza asked for any comments on the 16 best practices. He said he would like to consolidate and reword the best practices. He suggested that the best practices and knowledge statements should be focused on the regulatory practice and not at the industry.

Birny Birnbaum (Center for Economic Justice—CEJ) said the charge to the Task Force is limited to rate filings, but state insurance regulators should consider the review of pricing more generally. After marketing and underwriting, the data is already refined. If the company uses factors of concern to state insurance regulators—such as credit scoring, employment, occupation, etc.—then state insurance regulators should be concerned that the rate filing does not fully capture the pricing factors being used through underwriting tiers, etc. He said one of the fundamental areas of regulatory review is the data. State insurance regulators should ask about the data used to develop the model and judge whether the data is incomplete, biased or faulty in some way. He said that would be a best practice in review of the ratemaking model.

Mr. Piazza said state insurance regulators will be looking at the data and evaluating whether there are biases in the data. He said they will not be evaluating how the companies may have targeted their products.

Mr. Birnbaum clarified he does not suggest the review of models for marketing or underwriting in the scope of the charge; he said the scope to review ratemaking predictive models should include understanding the data used to develop, test and produce ratemaking results. Mr. Piazza agreed that bias is an issue identified in the knowledges.

Ralph Blanchard (Travelers) said the data described by Mr. Birnbaum is not biased. He said data has a characteristic. He said life insurance companies do not use mortality trends of the U.S. population because that data does not match to its underwriting. He said the data for ratemaking must have the same characteristic underwriters are using to underwrite.

Mr. Birnbaum said if the data describes the book of business and all attributes of those customers, then that would be fine. But if pricing factors have been applied in the underwriting process, then it is important to understand the situation, and companies should be disclosing that information.
Mr. Keen asked if Mr. Birnbaum’s suggestion includes advising state insurance regulators to look at variables in the model, but also evaluating variables excluded from the model and the reason why. Mr. Birnbaum said to look for unfair discrimination state insurance regulators need to know if the ratemaking data has been refined, especially if underwriting or rating tiers were used. He said the underwriting tiers might include risk variables that cause regulatory concern.

David Kodama (American Property Casualty Insurance Association—APCIA) said the APCIA’s member companies suggest that the regulatory review of models be consistent in approach with other requirements in the rate filing process. He said state insurance regulators should not impose different standards and requirements. He said state insurance regulators should give proper deference to existing Actuarial Standards of Practice (ASOPs). He said the APCIA supports consistency but not the imposition of new standards onto the process.

Mr. Piazza said the charge is to provide guidance to the states. He said the aim is to use standards that the states already have. He said many states need help to better understand and improve reviews. He said one potential result of the work might be for companies to provide information upfront in the filing rather than the states having to request information, which could eliminate numerous additional weeks in the review process.

Mr. McGill said state insurance regulators would like companies to provide support of models similarly to how the companies meet standards to support traditional rate filings. Mr. Birnbaum added that state insurance regulators are not creating new standards. He said state insurance regulators are responding to companies’ new data usage and techniques by developing new regulatory tools and techniques in response.

Mr. Piazza said the next steps will be for the drafting group to review the comments and provide suggested changes. Using the suggested changes, the white paper will be redrafted and exposed for comment. He said the process will likely result in the identification of some policy or other issues that are not actuarial. He said those issues may be brought to the attention of other NAIC groups. He said he expects the drafting and review processes might need to be repeated a couple of times, with an aim to submit the white paper to its parent committee and the Big Data (EX) Working Group by the Fall National Meeting. He said he would also like to be able to propose revisions to the Product Filing Review Handbook and state guidance at the same time.

6. Discussed NAIC Activities Regarding Casualty Actuarial Issues

Ms. DeFrain said predictive analytics sessions will be held June 6–7 at the NAIC/NIPR Insurance Summit in Kansas City, MO. She said the training will include case studies.

Mr. Grassel said Iowa’s Global Insurance Symposium (GIS) is being held April 23–25, with predictive analytics training for state insurance regulators being conducted in the days before and after the GIS.

Mr. Chou said the NAIC is providing training to enhance the Own Risk and Solvency Assessment (ORSA) reviews on Section 3 of the ORSA, which includes economic capital models.

7. Heard Reports from Actuarial Organizations

Kathleen C. Odomirok (American Academy of Actuaries—Academy) said the Academy’s Committee on Property and Liability Financial Reporting (COPLFR) educates practicing actuaries on regulatory requirements around the Statement of Actuarial Opinion. She said around 80 actuaries attended the annual seminar for opinion writers. Around 150 registrants participated in a follow-up webinar on selected topics, which was held Feb. 1 and focused on effective report writing. She said the COPLFR will be contacting state insurance regulators to help with updating the annual Loss Reserve Law Manual, updating the P/C practice note on Statements of Actuarial Opinion, and updating the practice note on risk transfer with respect to reinsurance contracts.

Lisa Slotznick (Academy) provided a list of activities from other Academy’s Casualty Practice Council groups. She said the Property and Casualty Risk-Based Capital Committee works with the NAIC. The P/C Extreme Events and Property Lines Committee will soon be publishing a paper on wildfires, is working on a catastrophe bond paper and is working on flood insurance issues. Other groups are providing predictive analytics training at the NAIC/NIPR Insurance Summit in Kansas City, MO, and are working on cybersecurity, cyber insurance and the federal Terrorism Risk Insurance Act (TRIA) program. Ms. Slotznick said there is a lot of research being conducted regarding cyber, wildfires and a climate risk index.
Draft Pending Adoption

Godfrey Perrott (Actuarial Board for Counseling and Discipline—ABCD) discussed the ABCD’s investigations of complaints and requests for counseling. Kathleen A. Riley (Actuarial Standards Board—ASB) discussed exposure and adoption actions taken on various ASOPs. Information can be found on the ASB website.

Providing information on P/C actuarial research, R. Dale Hall (Society of Actuaries—SOA) presented the SOA’s general insurance actuarial research and education, and Mr. Blanchard presented the CAS’ P/C actuarial research. Information about this research can be found on the SOA and CAS websites.

Having no further business, the Casualty Actuarial and Statistical (C) Task Force adjourned.

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Attachment Two
Consider Adoption of its Working Group Reports
The Actuarial Opinion (C) Working Group of the Casualty Actuarial and Statistical (C) Task Force met via conference call May 16, 2019. The following Working Group members participated: Julie Lederer, Chair (MO); Susan Gozzo Andrews (CT); Judy Mottar (IL); Tom Botsko (OH); Andrew Schallhorn (OK); Kevin Clark (PA); and Miriam Fisk (TX). Also participating was: Gordon Hay (NE).

1. Exposed 2019 Regulatory Guidance

Ms. Lederer said the Working Group has the following charge: “Based on language for the Annual Statement Instructions—Property/Casualty requiring completion of the appointed actuary’s attestation of qualification, provide additional guidance in the 2019 regulatory guidance document.” She said the 2019 regulatory guidance document (Regulatory Guidance) has been updated to reflect changes in the 2019 instructions and to add new guidance. She said there are two significant changes: 1) added background information on the NAIC’s Property/Casualty (P/C) Appointed Actuary Project; and 2) added guidance on the qualification documentation. There are some additional minor changes.

Kris DeFrain (NAIC) explained the new guidance on qualification documentation. She said the aim is to provide additional information about the required qualification documentation in the instructions. She noted the instructions are still exposed and changes could be made. The Regulatory Guidance would need to be adjusted to reflect any changes to the instructions.

Ms. DeFrain said the draft approach tracks point by point with the instructions, while the American Academy of Actuaries’ (Academy) attestation form follows the qualification standards requirements. She said the attestation form might be used in place of some of the items required by the instructions.

Ms. DeFrain said the Casualty Actuarial Society (CAS) and the Society of Actuaries (SOA) are implementing a new continuing education process. She said the proposed verification process was exposed by the Casualty Actuarial and Statistical (C) Task Force during its May 14 conference call. She said the Regulatory Guidance might be able to refer to that process rather than list numerous items. The CAS asked that its process be mentioned in the instructions; however, the current recommendation is that the CAS/SOA processes be mentioned in the Regulatory Guidance for now.

Ms. Lederer questioned whether the guidance should refer to how the actuary gained knowledge about the law. She said that is a general standard versus a specific standard. Ms. Andrews asked if the CAS/SOA process would be posted on the respective organizations’ websites. Ms. DeFrain said the plan is finalized, but the details are being discussed. Ms. Andrews said the CAS/SOA document could be attached to the regulatory guidance for the first year.

Ms. Lederer said that in the guidance section regarding Actuarial Guideline LI—The Application of Asset Adequacy Testing to Long-Term Care Insurance Reserves (AG 51), some actuaries are confused about whether Exhibit B, item 13.3 and item 13.4 were supposed to be included in the following instruction: “The Appointed Actuary should state that the items in the SCOPE, on which he or she is expressing an opinion, reflect Disclosure items 8 through 13.2 in Exhibit B.” She suggested clarifying it by adding that it was intentional that those two items were not included in that instruction, because the appointed actuary is not asked to opine on the reasonableness of the reserves associated with accident and health long duration contracts, except to the extent that the reserves are included within the amounts reported on Exhibit A of the Statement of Actuarial Opinion.

Ms. Mottar agreed with the change and said it is consistent with the handling of such in other blanks.

Mr. Schallhorn asked about timing of an exposure of the Regulatory Guidance, given the associated instructions are not yet adopted. Ms. Lederer said there are aggressive timelines for the project, and she would like to get the document exposed as soon as possible to allow as much discussion as possible.

The Working Group agreed to expose Section IV of the draft 2019 regulatory guidance for a public comment period ending July 8 and to communicate that the guidance is based on current draft instructions for the Statement of Actuarial Opinion.
Mr. Hay asked if appointed actuaries know about these changes, noting that he might communicate this to the appointed actuaries in Nebraska. The Working Group asked the actuarial associations to communicate about the exposure. Ms. DeFrain said she would also be giving presentations to actuarial associations this year on all of the changes to the Statement of Actuarial Opinion instructions and guidance.

Having no further business, the Actuarial Opinion (C) Working Group adjourned.
The Actuarial Opinion (C) Working Group of the Casualty Actuarial and Statistical (C) Task Force met via conference call May 29, May 21, May 7, and April 30, 2019. The following Working Group members participated: Julie Lederer, Chair (MO); Anna Krylova, Vice Chair (NM); Susan Gozzo Andrews (CT); David Christhilf (DC); Chantel Long and Judy Mottar (IL); Sandra Darby (ME); Gordon Hay (NE); Tom Botsko (OH); Andrew Schallhorn (OK); Kevin Clark (PA); and Miriam Fisk (TX).

1. **Adopted Response to the Financial Examiners Handbook (E) Technical Group’s Referral**

The Financial Examiners Handbook (E) Technical Group sent a referral to the Working Group to review the reserves/claims handling repository (property/casualty—P/C) (Attachments __). The referral letter requested feedback by May 31.

Ms. Lederer said the repository contains risks that can be applicable to a particular company, sample controls that a company might use to address those risks, and associated control and detailed tests an examiner might carry out during the exam. She provided a proposed draft response and subsequently incorporated some proposed changes submitted by Ralph Blanchard (Travelers).

During the April 30 and May 7 conference calls, the Working Group discussed the draft repository. Ms. Andrews suggested additional risks for actuarial report risk and data attribute testing risk. She said getting the actuarial report risk into the management’s letter helps to get the actuary to do a better job with the actuarial report. If the actuary is external, she is not sure about the controls. Ms. Long said the controls are the company’s controls. She said the actuarial report could just be a finding. Ms. Fisk said Texas obtains the Actuarial Report in phase one procedures. If items were not included in the report, they would request the required information from the appointed actuary. If the appointed actuary did not produce the information, that would end up in the management letter.

Ms. Long said there are some struggles during exams with the combination of claims handling and reserves because there are different reviewers, with the financial team generally in charge of claims handling review and actuaries handling reserves. Mr. Hay and Ms. Andrews agreed. Ms. Andrews said Connecticut creates a worksheet and assigns tasks. Ms. Long said Illinois checks corporate governance and compliance that the actuary reports to the Board of Directors, but handling of this risk has been a challenge. Ms. Fisk said an aim is for the Board to be involved, not necessarily using any particular practice. Mr. Hay said the claims discipline has gone through several evolutions, and the current items do not seem relevant for today’s claims processes.

Ms. Fisk said the term “actuary” should be more specific to refer to the Appointed Actuary, a consulting actuary, an internal actuary, etc. Ms. Andrews said she does explain to examiners about which actuary each of those references mean. Ms. Andrews said she does not want to be specific about which actuary when discussing the difference in management’s booked reserves and the actuary’s estimate. Mr. Blanchard said the appointed actuary’s opinion comes after the management’s determination of reserves; so, the risk is not with the numbers being different. Mr. Hay said the concern is when management books materially less than the actuary’s estimate.

Ms. Fisk said she wished the repository would be a minimum standard, but that is not specifically what the Technical Group wants the repository to be. She said many of the controls are based on regulatory requirements imposed on insurers, but state insurance regulators can also list best practices for controls, even when there is no requirement. Ms. Long said there are requirements in law about having investment policies, but not about reserves. She is not sure how to hold a company to a standard when there is no requirement. Ms. Fisk said that goes to the question about the whole purpose of the financial examination. Ms. Andrews said if nothing else, the Board requirements should match to current requirements in the instructions.

Ms. Fisk said claims data is included, but premium data could be significant too. Perhaps the wording should be “data underlying the actuarial analysis.” That would also include all segmentation: gross, net and ceded.

During the May 21 conference call, the Working Group discussed a re-draft of the repository comments written by Ms. Fisk and a draft letter written by Ms. Lederer. Ms. Fisk said the changes were previously proposed by others and are now...
incorporated into one document. She said the wording might differ a little from what was previously proposed for consistency of wording.

Mr. Blanchard said the reference to compare Schedule P to the Underwriting Investment Exhibit will not work for a pooled company. He suggested adding that as a note. He said there is a reference to having a legal department involved; some companies have lawyers in the claims department. He suggested the removal of the “legal department” reference.

The Working Group members debated whether the risks should be broadly stated or split. Ms. Long said the preference is for broad risks, which can be split out if needed. She said there is no reason to have duplicate controls with split risks. Ms. Andrews said she prefers more specific risks at the onset. Mr. Hay agreed, saying that the review of reserves almost always results in a detailed review. Ms. Fisk said that depends on the size of the company. She said a note on page 11 might be useful to explain that it may be appropriate to split the risk statement into different risks, especially where detailed testing might be performed for a specific part of the risk. Ms. Lederer said something similar could be added to the letter.

Ms. Lederer reminded the Working Group that the referral letter included the following: “The exam repositories are not intended to provide an all-inclusive listing of the potential risks, nor to provide a minimum baseline of which risks are required to be identified on all exams.” She said that suggests that not all risks need to be included on the list, and not all risks will be applicable to each entity. Ms. Long said the financial examiners will rely on that list, and she wonders whether the list is a measurement for accreditation. She suggested having a regulator-to-regulator call.

The Working Group met May 29 in regulator-to-regulator session, pursuant to paragraph 3 (specific companies, entities or individuals) of the NAIC Policy Statement on Open Meetings. The Working Group decided to hold an email vote following the meeting.

On June 3, the Working Group concluded an email vote to adopt a letter and repository as a response to the Technical Group (Attachment 1). Five members voted for the motion; two voted against the motion. The proposal was sent to the Technical Group with notice that: 1) the vote was not unanimous; and 2) some members of the Working Group preferred future discussions on this topic. The Technical Group will consider the submitted comments to redraft and expose the repository for written comment.

Having no further business, the Actuarial Opinion (C) Working Group adjourned.

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Attachment Three

Discuss the Predictive Analytics White Paper
EXPOSURE NOTE: The drafting group are still considering comments on the 5/14/19 draft; no changes are yet made to the previously exposed sections of the paper. Two new sections are drafted in the paper and will be exposed for public comment at the Summer National Meeting: Part VIII Proposed Changes to the Product Filing Review Handbook, and Part IX Proposed State Guidance. Please note that we expect changes from the comments on the 5/14 draft and any changes made will also be reflected in these two new sections.

Casualty Actuarial and Statistical (C) Task Force

Regulatory Review of Predictive Models

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I. INTRODUCTION

Insurers’ use of predictive analytics along with big data has significant potential benefits to both consumers and insurers. Predictive analytics can reveal insights into the relationship between consumer behavior and the cost of insurance, lower the cost of insurance for many, and provide incentives for consumers to better control and mitigate loss. However, predictive analytic techniques are evolving rapidly and leaving many regulators without the necessary tools to effectively review insurers’ use of predictive models in insurance applications.

When a rate plan is truly innovative, the insurer must anticipate or imagine the reviewers’ interests because reviewers will respond with unanticipated questions and have unique educational needs. Insurers can learn from the questions, teach the reviewers, and so forth. When that back-and-forth learning is memorialized and retained, filing requirements and insurer presentations can be routinely organized to meet or exceed reviewers’ needs and expectations. Hopefully, this paper helps bring more consistency and to the art of reviewing predictive models within a rate filing.

The Casualty Actuarial and Statistical (C) Task Force (CASTF) has been charged with identifying best practices to serve as a guide to state insurance departments in their review of predictive models’ underlying rating plans. There were two charges given to CASTF by the Property and Casualty Insurance (C) Committee at the request of the Big Data (EX) Working Group:

A. Draft and propose changes to the Product Filing Review Handbook to include best practices for review of predictive models and analytics filed by insurers to justify rates.
B. Draft and propose state guidance (e.g., information, data) for rate filings that are based on complex predictive models.

This paper will identify best practices when reviewing predictive models and analytics filed by insurers with regulators to justify rates and provide state guidance for review of rate filings based on predictive models. Upon adoption of this paper by the Executive (EX) Committee and Plenary, the Task Force will evaluate how to incorporate these best practices into the Product Filing Review Handbook and will recommend such changes to the Speed to Market (EX) Working Group.

II. WHAT IS A “BEST PRACTICE?”

A best practice is a form of program evaluation in public policy. At its most basic level, a practice is a “tangible and visible behavior… [based on] an idea about how the actions… will solve a problem or achieve a goal.”2 Best practices are used to maintain quality as an alternative to mandatory legislated standards and can be based on self-assessment or benchmarking.3 Therefore, a best practice represents an effective method of problem solving. The "problem" regulators want to solve is probably better posed as seeking an answer to this question: How can regulators determine that predictive models, as used in rate filings, are compliant with state laws and regulations?

Key Regulatory Principles

In this paper, best practices are based on the following principles that promote a comprehensive and coordinated review of predictive models across states:

1. State insurance regulators will maintain their current rate regulatory authority.
2. State insurance regulators will be able to share information to aid companies in getting insurance products to market more quickly.
3. State insurance regulators will share expertise and discuss technical issues regarding predictive models.
4. State insurance regulators will maintain confidentiality, where appropriate, regarding predictive models.

In this paper, best practices are presented in the form of guidance to regulators who review predictive models and to insurance companies filing rating plans that incorporate predictive models. Guidance will identify specific information

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useful to a regulator in the review of a predictive model, comment on what might be important about that information and, where appropriate, provide insight as to when the information might identify an issue the regulator needs to be aware of or explore further.

III. DO REGULATORS NEED BEST PRACTICES TO REVIEW PREDICTIVE MODELS?

The term “predictive model” refers to a set of models that use statistics to predict outcomes. When applied to insurance, the model is chosen to estimate the probability or expected value of an outcome given a set amount of input data; for example, models can predict the frequency of loss, the severity of loss, or the pure premium. The generalized linear model (GLM) is a commonly used predictive model in insurance applications, particularly in building an insurance product’s rating plan.

Depending on definitional boundaries, predictive modeling can sometimes overlap with the field of machine learning. In this modeling space, predictive modeling is often referred to as predictive analytics.

Before GLMs became vogue, rating plans were built using univariate methods. Univariate methods were considered intuitive and easy to demonstrate the relationship to costs (loss and/or expense). Today, many insurers consider univariate methods too simplistic since they do not take into account the interaction (or dependencies) of the selected input variables.

According to many in the insurance industry, GLMs introduce significant improvements over univariate-based rating plans by automatically adjusting for correlations among input variables. Today, the majority of predictive models used in private passenger automobile and homeowners’ rating plans are GLMs. However, GLM results are not always intuitive, and the relationship to costs may be difficult to explain. This is a primary reason regulators can benefit from best practices.

A GLM consists of three elements:

- Each component of Y is independent and a probability distribution from the exponential family, or more generally, a selected variance function and dispersion parameter.
- A linear predictor $\eta = X\beta$.
- A link function $g$ such that $E(Y) = \mu = g^{-1}(\eta)$.

As can be seen in the description of the three GLM components above, it may take more than a casual introduction to statistics to comprehend the construction of a GLM. As stated earlier, a downside to GLMs is that it is more challenging to interpret the GLM output than with univariate models.

GLM software provides point estimates and allows the modeler to consider standard errors and confidence intervals. GLM output is typically assumed to be 100% credible no matter the size of the underlying data set. If some segments have little data, the resulting uncertainty would not be reflected in the GLM parameter estimates themselves (although it might be reflected in the standard errors, confidence intervals, etc.). Even though the process of selecting relativities often includes adjusting the raw GLM output, the resultant selections are not then credibility-weighted with any complement of credibility. Nevertheless, selected relativities based on GLM model output may differ from GLM point estimates.

Because of this presumption in credibility, which may or may not be valid in practice, the modeler and the regulator reviewing the model would need to engage in thoughtful consideration when incorporating GLM output into a rating plan to ensure that model predictiveness is not compromised by any lack of actual credibility. Therefore, to mitigate the risk that model credibility or predictiveness is lacking, a complete filing for a rating plan that incorporates GLM output should include validation evidence for the rating plan, not just the statistical model.

To further complicate regulatory review of models in the future, modeling methods are evolving rapidly and not limited just to GLMs. As computing power grows exponentially, it is opening up the modeling world to more sophisticated forms of data acquisition and data analysis. Insurance actuaries and data scientists seek increased predictiveness by using even more complex predictive modeling methods. Examples of these are predictive models utilizing random forests, decision

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4 A more thorough exploration of different predictive models will be found in many statistics’ books, including Geisser, Seymour (September 2016). *Predictive Inference: An Introduction*. New York: Chapman & Hall.

5 The generalized linear model (GLM) is a flexible family of models that are unified under a single method. Types of GLM include logistic regression, Poisson regression, gamma regression and multinomial regression.

6 More information on model elements can be found in most statistics’ books. © 2019 National Association of Insurance Commissioners
trees, neural networks, or combinations of available modeling methods (often referred to as ensembles). These evolving techniques will make the regulators’ understanding and oversight of filed rating plans incorporating predictive models even more challenging.

In addition to the growing complexity of predictive models, many state insurance departments do not have in-house actuarial support or have limited resources to contract out for support when reviewing rate filings that include use of predictive models. The Big Data (EX) Working Group identified the need to provide states with guidance and assistance when reviewing predictive models underlying filed rating plans. The Working Group circulated a proposal addressing aid to state insurance regulators in the review of predictive models as used in private passenger automobile and homeowners’ insurance rate filings. This proposal was circulated to all of the Working Group members and interested parties on December 19, 2017, for a public comment period ending January 12, 2018. The Big Data Working Group effort resulted in the new CASTF charges (see the Introduction section) with identifying best practices that provide guidance to states in the review of predictive models.

So, to get to the question asked by the title of this section: Do regulators need best practices to review predictive models? It might be better to ask this question another way: Are best practices in the review of predictive models of value to regulators and insurance companies? The answer is “yes” to both questions. Best practices will aid regulatory reviewers by raising their level of model understanding. With regard to scorecard models and the model algorithm, there is often not sufficient support for relative weight, parameter values, or scores of each variable. Best practices can potentially aid in fixing this problem.

However, best practices are not intended to create standards for filings that include predictive models. Rather, best practices will assist the states in identifying the model elements they should be looking for in a filing that will aid the regulator in understanding why the company believes that the filed predictive model improves the company’s rating plan, making that rating plan fairer to all consumers in the marketplace. To make this work, both regulators and industry need to recognize that:

- Best practices merely provide guidance to regulators in their essential and authoritative role over the rating plans in their state.
- All states may have a need to review predictive models whether that occurs with approval of rating plans or in a market conduct exam. Best practices help the regulator identify elements of a model that may influence the regulatory review as to whether modeled rates are appropriately justified. Each regulator needs to decide if the insurer’s proposed rates are compliant with state laws and regulations and whether to act on that information.
- Best practices will lead to improved quality in predictive model reviews across states, aiding speed to market and competitiveness of the state marketplace.
- Best practices provide a framework for states to share knowledge and resources to facilitate the technical review of predictive models.
- Best practices aid training of new regulators and/or regulators new to reviewing predictive models. (This is especially useful for those regulators who do not actively participate in NAIC discussions related to the subject of predictive models.)
- Each regulator adopting best practices will be better able to identify the resources needed to assist their state in the review of predictive models.

Lastly, from this point on in this paper, best practices will be referred to as “guidance.” This reference is in line with the intent of this paper to support individual state autonomy in the review of predictive models.

IV. SCOPE

The focus of this paper will be on GLMs used to create private passenger automobile and home insurance rating plans. The knowledge needed to review predictive models, and guidance in this paper regarding GLMs for personal automobile and home insurance may be transferrable when the review involves GLMs applied to other lines of business. Modeling
draft 5/14/2019

as adopted by the casualty actuarial and statistical (c) task force on xx/xx/xx

depends on context, so the glm reviewer has to be alert for data challenges and business applications that differ from the most familiar personal lines. for example, compared to personal lines, modeling for rates in commercial lines is more likely to encounter low volumes of historical data, dependence on advisory loss costs, unique large accounts with some large deductibles and products that build policies from numerous line-of-business and coverage building blocks. commercial lines commonly use individual risk modifications following experience, judgment, and/or expense considerations. a regulator may never see commercial excess and surplus lines filings. the legal and regulatory constraints (including state variations) are likely to be more evolved, and challenging, in personal lines. a glm rate model for personal lines in 2019 is either an update or a late-adopter's defensive tactic. adopting glm for commercial lines has a shorter history.

guidance offered here might be useful (with deeper adaptations) when starting to review different types of predictive models. if the model is not a glm, some listed items might not apply. not all predictive models generate p-values or f tests. depending on the model type, other considerations might be important. when transferring guidance to other lines of business and other types of model, unique considerations may arise depending on the context in which a predictive model is proposed to be deployed, the uses to which it is proposed to be put, and the potential consequences for the insurer, its customers and its competitors. this paper does not delve into these possible considerations but regulators should be prepared to address them as they arise.

v. confidentiality

regulatory reviewers are required to protect confidential information in accordance with applicable state law. however, insurers should be aware that a rate filing might become part of the public record. each state determines the confidentiality of a rate filing, supplemental material to the filing, when filing information might become public, the procedure to request that filing information be held confidentially, and the procedure by which a public records request is made. it is incumbent on an insurer to be familiar with each state’s laws regarding the confidentiality of information submitted with their rate filing.

vi. guidance for regulatory review of predictive models (best practices)

best practices will help the regulator understand if a predictive model is cost based, if the predictive model is compliant with state law, and how the model improves, the company’s rating plan. best practices can, also, make the regulator's review more consistent across states and more efficient, and assist companies in getting their products to market faster. with this in mind, the regulator's review of predictive models should:

1. ensure that the factors developed based on the model produce rates that are not excessive, inadequate, or unfairly discriminatory.
   a. review the overall rate level impact of the revisions proposed based on the predictive model output in comparison to rate level indications provided by the filer.
   b. review the premium disruption for individual policyholders and how the disruptions can be explained to individual consumers.
   c. review the individual input characteristics to and output factors from the predictive model (and its sub-models), as well as, associated selected relativities to ensure they are not unfairly discriminatory.

2. thoroughly review all aspects of the model including the source data, assumptions, adjustments, variables, and resulting output.
   a. determine that individual input characteristics to a predictive model are related to the expected loss or expense differences in risk. each input characteristic should have an intuitive or demonstrable actual relationship to expected loss or expense.
   b. determine that the data used as input to the predictive model is accurate, including a clear understanding how missing values, erroneous values and outliers are handled.
   c. determine that any adjustments to the raw data are handled appropriately, including but not limited to, trending, development, capping, removal of catastrophes.
   d. determine that rating factors from a predictive model are related to expected loss or expense differences in risk. each rating factor should have a demonstrable actual relationship to expected loss or expense.
e. Obtain a clear understanding how often each risk characteristic, used as input to the model, is updated and whether the model is periodically rerun, so model output reflects changes to non-static risk characteristics.

3. Evaluate how the model interacts with and improves the rating plan.
   a. Obtain a clear understanding of the characteristics that are input to a predictive model (and its sub-models), their relationship to each other and their relationship to non-modeled characteristics/variables used to calculate a risk’s premium.
   b. Obtain a clear understanding of how the selected predictive model was built and why the insurer believes this type of model works in a private passenger automobile or homeowner’s insurance risk application.
   c. Obtain a clear understanding of how model output interacts with non-modeled characteristics/variables used to calculate a risk’s premium.
   d. Obtain a clear understanding of how the predictive model was integrated into the insurer’s state rating plan and how it improves that plan.
   e. For predictive model refreshes, determine whether sufficient validation was performed to ensure the model is still a good fit.

4. Enable competition and innovation to promote the growth, financial stability, and efficiency of the insurance marketplace.
   a. Enable innovation in the pricing of insurance through acceptance of predictive models, provided they are actuarially sound and in compliance with state laws.
   b. Protect the confidentiality of filed predictive models and supporting information in accordance with state law.
   c. Review predictive models in a timely manner to enable reasonable speed to market.

VII. PREDICTIVE MODELS – INFORMATION FOR REGULATORY REVIEW

This section of the paper identifies the information a regulator may need to review a predictive model used by an insurer to support a filed P/C insurance rating plan. The list is lengthy but not exhaustive. It is not intended to limit the authority of a regulator to request additional information in support of the model or filed rating plan. Nor is every item on the list intended to be a requirement for every filing. However, the items listed should help guide a regulator to obtain sufficient information to determine if the rating plan meets state specific filing and legal requirements.

Though the list seems long, the insurer should already have internal documentation on the model for more than half of the information listed. The remaining items on the list require either minimal analysis (approximately 25%) or deeper analysis to generate the information for a regulator (approximately 25%)

The “Importance to Regulator’s Review” ranking of information a regulator may need to review is based on the following level criteria:

Level 1 - This information is necessary to begin the review of a predictive model. These data elements pertain to basic information about the type and structure of the model, the data and variables used, the assumptions made, and the goodness of fit. Ideally, this information would be included in the filing documentation with the initial submission of a filing made based on a predictive model.

Level 2 - This information is necessary to continue the review of all but the most basic models; such as those based only on the filer’s internal data and only including variables that are in the filed rating plan. These data elements provide more detailed information about the model and address questions arising from review of the information in Level 1. Insurers concerned with speed to market may also want to include this information in the filing documentation.

Level 3 - This information is necessary to continue the review of a model where concerns have been raised and not resolved based on review of the information in Levels 1 and 2. These data elements address even more detailed aspects of the model including (to be listed after we assign levels). This information does not necessarily need to be included with the initial submission, unless specifically requested in a particular jurisdiction, as it is typically requested only if the reviewer has concerns that the model may not comply with state laws.
Level 4 - This information is necessary to continue the review of a model where concerns have been raised and not resolved based on the information in Levels 1, 2, and 3. This most granular level of detail is addressing the basic building blocks of the model and does not necessarily need to be included by the filer with the initial submission, unless specifically requested in a particular jurisdiction. It is typically requested only if the reviewer has serious concerns that the model produces rates or factors that are excessive, inadequate, or unfairly discriminatory.

A. **Selecting Model Input**

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance to the Regulator's Review</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Available Data Sources</td>
<td>Review the details of all data sources for input to the model (only need sources for filed input characteristics). For each source, obtain a list all data elements used as input to the model that came from that source.</td>
<td>1</td>
<td>Request details of all data sources. For insurance experience (policy or claim), determine whether calendar, accident, fiscal or policy year data and when it was last evaluated. For each data source, get a list all data elements used as input to the model that came from that source. For insurance data, get a list all companies whose data is included in the datasets. Request details of any non-insurance data used (customer-provided or other), including who owns this data, on how consumers can verify their data and correct errors, whether the data was collected by use of a questionnaire/checklist, whether data was voluntarily reported by the applicant, and whether any of the data is subject to the Fair Credit Reporting Act. If the data is from an outside source, find out what steps were taken to verify the data was accurate.</td>
</tr>
<tr>
<td>A.1.a</td>
<td>Reconcile raw insurance data and with available external insurance reports.</td>
<td>3</td>
<td>Accuracy of insurance data should be reviewed as well.</td>
</tr>
<tr>
<td>A.1.b</td>
<td>Review the geographic scope and geographic exposure distribution of the raw data for relevance to the state where the model is filed.</td>
<td>1</td>
<td>Evaluate whether the data is relevant to the loss potential for which it is being used. For example, verify that hurricane data is only used where hurricanes can occur.</td>
</tr>
<tr>
<td>A.1.d</td>
<td>Be aware of any non-insurance data used (customer-provided or other), including who owns this data, how consumers can verify their data and correct errors, whether the data was collected by use of a questionnaire/checklist, whether it was voluntarily reported by the applicant, and whether any of the variables are subject to the Fair Credit Reporting Act. If the data is from an outside source, determine the steps that were taken by the company to verify the data was accurate.</td>
<td>2</td>
<td>If the data is from a third-party source, the company should provide information on the source. Depending on the nature of the data, data should be documented and an overview of who owns it and the topic of consumer verification should be addressed.</td>
</tr>
</tbody>
</table>
2. **Sub-Models**

<table>
<thead>
<tr>
<th>A.2.a</th>
<th>Consider the relevance of (e.g., is there a bias) of overlapping data or variables used in the model and sub-models.</th>
<th>1</th>
<th>Check if the same variables/datasets were used in both the model, a submodel or as stand-alone rating characteristics. If so, verify there was no double-counting or redundancy.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.2.b</td>
<td>Determine if sub-model output was used as input to the GLM; obtain the vendor name, and the name and version of the sub-model.</td>
<td>1</td>
<td>The regulator needs to know name of 3rd party vendor and contact whether model or sub-model. Examples of such sub-models include credit/financial scoring algorithms and household composite score models. Sub-models can be evaluated separately and in the same manner as the primary model under evaluation. A sub-model contact for additional information should be provided. SMEs on sub-model may need to be brought into the conversation with regulators (whether in-house or 3rd-party sub-models are used).</td>
</tr>
<tr>
<td>A.2.c</td>
<td>If using catastrophe model output, identify the vendor and the model settings/assumptions used when the model was run.</td>
<td>1</td>
<td>For example, it is important to know hurricane model settings for storm surge, demand surge, long/short-term views.</td>
</tr>
<tr>
<td>A.2.d</td>
<td>If using catastrophe model output (a sub-model) as input to the GLM under review, verify whether loss associated with the modeled output was removed from the loss experience datasets.</td>
<td>1</td>
<td>If a weather-based sub-model is input to the GLM under review, loss data used to develop the model should not include loss experience associated with the weather-based sub-model. Doing so could cause distortions in the modeled results by double counting such losses when determining relativities or loss loads in the filed rating plan. For example, redundant losses in the data may occur when non-hurricane wind losses are included in the data while also using a severe convective storm model in the actuarial indication. Such redundancy may also occur with the inclusion of fluvial or pluvial flood losses when using a flood model, inclusion of freeze losses when using a winter storm model or including demand surge caused by any catastrophic event.</td>
</tr>
<tr>
<td>A.2.e</td>
<td>If using output of any scoring algorithms, obtain a list of the variables used to determine the score and provide the source of the data used to calculate the score.</td>
<td>1</td>
<td>Any sub-model should be reviewed in the same manner as the primary model that uses the sub-model’s output as input.</td>
</tr>
<tr>
<td>A.2.f</td>
<td>Determine if the sub-model was previously approved (or accepted) by the regulatory agency.</td>
<td>2</td>
<td>If the sub-model was previously approved, that may change the extent of the sub-model’s review. If approved, verify when and that it was the same model currently under review.</td>
</tr>
</tbody>
</table>

3. **Adjustments to Data**
| A.3.a | Determine if premium, exposure, loss or expense data were adjusted (e.g., developed, trended, adjusted for catastrophe experience or capped) and, if so, how? Do the adjustments vary for different segments of the data and, if so, identify the segments and how was the data adjusted? | 2 | Look for anomalies in the data that should be addressed. For example, is there an extreme loss event in the data? If other processes were used to load rates for specific loss events, how is the impact of those losses considered? Examples of losses that can contribute to anomalies in the data are large losses, flood, hurricane or severe convective storm models for PPA comprehensive or home losses. |
| A.3.b | Identify adjustments that were made to raw data, e.g., transformations, binning and/or categorizations. If any, identify the name of the characteristic/variable and obtain a description of the adjustment. | 1 | This is most relevant for variables that have been "scrubbed" or adjusted. Though most regulators may never ask for aggregated data and do not plan to rebuild any models, a regulator may ask for this aggregated data or subsets of it. It would be useful to the regulator if the percentage of exposures and premium for missing information from the model data by category were provided. This data can be displayed in either graphical or tabular formats. |
| A.3.c | Ask for aggregated data (one data set of pre-adjusted/scrubbed data and one data set of post-adjusted/scrubbed data) that allows the regulator to focus on the univariate distributions and compare raw data to adjusted/binned/transformed/etc. data. | 3 | |
| A.3.d | Determine how missing data was handled. | 1 | |
| A.3.e | If duplicate records exist, determine how they were handled. | 1 | |
| A.3.f | Determine if there were any data outliers identified and subsequently adjusted during the scrubbing process. Get a list (with description) of the outliers and determine what adjustments were made to these outliers. | 2 | |

4. Data Organization

| A.4.a | Obtain documentation on the methods used to compile and organize data, including procedures to merge data from different sources and a description of any preliminary analyses, data checks, and logical tests performed on the data and the results of those tests. | 2 | This should explain how data from separate sources was merged. |
Obtain documentation on the process for reviewing the appropriateness, reasonableness, consistency and comprehensiveness of the data, including a discussion of the intuitive relationship the data has to the predicted variable.  

An example is when by-peril or by-coverage modeling is performed; the documentation should be for each peril/coverage and make intuitive sense. For example, if “murder” or “theft” data are used to predict the wind peril, provide support and an intuitive explanation of their use.

Identify material findings the company had during their data review and obtain an explanation of any potential material limitations, defects, bias or unresolved concerns found or believed to exist in the data. If issues or limitations in the data influenced modeling analysis and/or results, obtain a description of those concerns and an explanation how modeling analysis was adjusted and/or results were impacted.
# B. Building the Model

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>B.1.a</td>
<td>Identify the type of model (e.g. Generalized Linear Model – GLM, decision tree, Bayesian Generalized Linear Model, Gradient-Boosting Machine, neural network, etc.). Understand the model’s role in the rating system and provide the reasons why that type of model is an appropriate choice for that role.</td>
<td>1</td>
<td>There should be an explanation of why the model (using the variables included in it) is appropriate for the line of business. If by-peril or by-coverage modeling is used, the explanation should be by-peril/coverage.</td>
</tr>
<tr>
<td>B.1.b</td>
<td>Identify the software used for model development. Obtain the name of the software vendor/developer, software product and a software version reference.</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>B.1.c</td>
<td>Obtain a description how the available data was divided between model training, test and validation datasets. The description should include an explanation why the selected approach was deemed most appropriate, and whether the company made any further subdivisions of available data and reasons for the subdivisions (e.g., a portion separated from training data to support testing of components during model building). Determine if the validation data was accessed before model training was completed and, if so, obtain an explanation how and why that came to occur.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>B.1.d</td>
<td>Obtain a brief description of the development process, from initial concept to final model and filed rating plan (in less than three pages of narrative).</td>
<td>1</td>
<td>The narrative should have the same scope as the filing.</td>
</tr>
<tr>
<td>B.1.e</td>
<td>Obtain a narrative on whether loss ratio, pure premium or frequency/severity analyses were performed and, if separate frequency/severity modeling was performed, how pure premiums were determined.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>B.1.f</td>
<td>Identify the model’s target variable.</td>
<td>1</td>
<td>A clear description of the target variable is key to understanding the purpose of the model.</td>
</tr>
</tbody>
</table>
### B.1.g
Obtain a detailed description of the variable selection process.

1

The narrative regarding the variable selection process may address matters such as the criteria upon which variables were selected or omitted, identification of the number of preliminary variables considered in developing the model versus the number of variables that remained, and any statutory or regulatory limitations that were taken into account when making the decisions regarding variable selection.

### B.1.h
In conjunction with variable selection, obtain a narrative on how the Company determine the granularity of the rating variables during model development.

1

### B.1.i
Determine if model input data was segmented in any way, e.g., was modeling performed on a by-coverage, by-peril, or by-form basis. If so, obtain a description of data segmentation and the reasons for data segmentation.

1

The regulator would use this to follow the logic of the modeling process.

### B.1.j
If adjustments to the model were made based on credibility considerations, obtain an explanation of the credibility considerations and how the adjustments were applied.

2

Adjustments may be needed given models do not explicitly consider the credibility of the input data or the model’s resulting output; models take input data at face value and assume 100% credibility when producing modeled output.

### 2. Medium-Level Narrative for Building the Model

#### B.2.a
At crucial points in model development, if selections were made among alternatives regarding model assumptions or techniques, obtain a narrative on the judgment used to make those selections.

2

#### B.2.b
If post-model adjustments were made to the data and the model was rerun, obtain an explanation on the details and the rationale for those adjustments.

2

Evaluate the addition or removal of variables and the model fitting. It is not necessary for the company to discuss each iteration of adding and subtracting variables, but the regulator should gain a general understanding how these adjustments were done, including any statistical improvement measures relied upon.

#### B.2.c
Obtain a description of univariate balancing and testing performed during the model-building process, including an explanation of the thought processes involved.

2

Further elaboration from B.2.b.
B.2.d | Obtain a description of the 2-way balancing and testing that was performed during the model-building process, including an explanation of the thought processes of including (or not including) interaction terms. | 2 | Further elaboration from B.2.a and B.2.b. |
---|---|---|---|
B.2.e | For the GLM, identify the link function used. Identify which distribution was used for the model (e.g., Poisson, Gaussian, log-normal, Tweedie). Obtain an explanation why the link function and distribution were chosen. Obtain the formulas for the distribution and link functions, including specific numerical parameters of the distribution. | 1 | |
B.2.f | Obtain a narrative on the formula relationship between the data and the model outputs, with a definition of each model input and output. The narrative should include all coefficients necessary to evaluate the predicted pure premium, relativity or other value, for any real or hypothetical set of inputs. | 2 | B.4.i and B.4.m will show the mathematical functions involved and could be used to reproduce some model predictions. |
B.2.g | If there were data situations in which GLM weights were used, obtain an explanation of how and why they were used. | 3 | Investigate whether identical records were combined to build the model. |

### 3. Predictor Variables

B.3.a | Obtain a complete data dictionary, including the names, types, definitions and uses of each predictor variable, offset variable, control variable, proxy variable, geographic variable, geodemographic variable and all other variables in the model (including sub-models and external models). | 1 | Types of variables might be continuous, discrete, Boolean, etc. Definitions should not use programming language or code. For any variable(s) intended to function as a control or offset, obtain an explanation of their rationale and impact. |
B.3.b | Obtain a list of predictor variables considered but not used in the final model, and the rationale for their removal. | 4 | The rationale for this requirement is to identify variables that the company finds to be predictive but ultimately may reject for reasons other than loss-cost considerations (e.g., price optimization) |
B.3.c | Obtain a correlation matrix for all predictor variables included in the model and sub-model(s). | 2 | While GLMs accommodate collinearity, the correlation matrix provides more information about the magnitude of correlation between variables. |
B.3.d | Obtain an intuitive explanation for why an increase in each predictor variable should increase or decrease frequency, severity, loss costs, expenses, or any element or characteristic being predicted. | 2 | The explanation should go beyond demonstrating correlation. Considering possible causation is relevant, but proving causation is neither practical nor expected. If no intuitive explanation can be provided, greater scrutiny may be appropriate. |
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.3.e</td>
<td>If the modeler made use of one or more dimensionality reduction techniques, such as a Principal Component Analysis (PCA), obtain a narrative about that process, an explanation why that technique was chosen, and a description of the step-by-step process used to transform observations (usually correlated) into a set of linearly uncorrelated variables. In each instance, obtain a list of the pre-transformation and post-transformation variable names, and an explanation how the results of the dimensionality reduction technique was used within the model.</td>
</tr>
</tbody>
</table>

4. Adjusting Data, Model Validation and Goodness-of-Fit Measures

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.4.a</td>
<td>Obtain a description of the methods used to assess the statistical significance/goodness of the fit of the model to validation data, such as lift charts and statistical tests. Compare the model's projected results to historical actual results and verify that modeled results are reasonably similar to actual results from validation data. For models that are built using multi-state data, validation data for some segments of risk is likely to have low credibility in individual states. Nevertheless, some regulators require model validation on State-only data, especially when analysis using state-only data contradicts the countrywide results. State-only data might be more applicable but could also be impacted by low credibility for some segments of risk. Look for geographic stability measures, e.g., across states or territories within state.</td>
</tr>
<tr>
<td>B.4.b</td>
<td>Obtain a description of any adjustments that were made in the data with respect to scaling for discrete variables or binning the data. A.3.f addresses pre-modeling adjustments to data. In the mid-level narrative context, B.2.a addresses judgments of any kind made during modeling. Only choices made at &quot;crucial points in model development&quot; need be discussed.</td>
</tr>
<tr>
<td>B.4.c</td>
<td>Obtain a description of any transformations made for continuous variables. A.3.f addresses pre-modeling transformations to data. In the mid-level narrative context, B.2.a addresses transformations of any kind made during modeling. Only choices made at &quot;crucial points in model development&quot; need be discussed. To build a unique model with acceptable goodness-of-fit to the training data, important steps have been taken. Such steps may have been numerous, and at least some of the judgments involved may be difficult to describe and explain. Nevertheless, neither the model filer nor the reviewer can assume these steps are immaterial, generally understood, or implied by the model's generic form. The model filer should anticipate regulatory concerns in its initial submission by identifying and explaining the model fitting steps it considers most important. If a reviewer has regulatory concerns not resolved by the initial submission, appropriate follow-up inquiries are likely to depend on the particular circumstances.</td>
</tr>
<tr>
<td>B.4.d</td>
<td>For each discrete variable level, review the parameter value, confidence intervals, chi-square tests, p-values and any other relevant and material tests. Determine if model development data, validation data, test data or other data was used for these tests.</td>
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<tr>
<td></td>
<td>Typical p-values greater than 5% are large and should be questioned. Reasonable business judgment can sometimes provide legitimate support for high p-values. Reasonableness of the p-value threshold could also vary depending on the context of the model, e.g., the threshold might be lower when many candidate variables were evaluated for inclusion in the model.</td>
</tr>
<tr>
<td></td>
<td>Overall lift charts and/or statistical tests using validation data may not provide enough of the picture. If there is concern about one or more individual variables, the reviewer may obtain, for each discrete variable level, the parameter value, confidence intervals, chi-square tests, p-values and any other relevant and material tests. For variables that are modeled continuously, it may be sufficient to obtain statistics around the modeled parameters; for example, confidence intervals around each level of an AOI curve might be more than what is needed.</td>
</tr>
<tr>
<td>B.4.e</td>
<td>Identify the threshold for statistical significance and explain why it was selected. Obtain a reasonable and appropriately supported explanation for keeping the variable for each discrete variable level where the p-values were not less than the chosen threshold.</td>
</tr>
<tr>
<td></td>
<td>Typical p-values greater than 5% are large and should be questioned. Reasonable business judgment can sometimes provide legitimate support for high p-values. Reasonableness of the p-value threshold could also vary depending on the context of the model, e.g., the threshold might be lower when many candidate variables were evaluated for inclusion in the model.</td>
</tr>
<tr>
<td></td>
<td>Overall lift charts and/or statistical tests using validation data may not provide enough of the picture. If there is concern about one or more individual variables, the reviewer may obtain, for each discrete variable level, the parameter value, confidence intervals, chi-square tests, p-values and any other relevant and material tests. For variables that are modeled continuously, it may be sufficient to obtain statistics around the modeled parameters; for example, confidence intervals around each level of an AOI curve might be more than what is needed.</td>
</tr>
<tr>
<td>B.4.f</td>
<td>For overall discrete variables, review type 3 chi-square tests, p-values. F tests and any other relevant and material test. Determine if model development data, validation data, test data or other data was used for these tests.</td>
</tr>
<tr>
<td>B.4.g</td>
<td>Obtain evidence that the model fits the training data well, for individual variables, for any relevant combinations of variables and for, the overall model.</td>
</tr>
<tr>
<td>B.4.h</td>
<td>For continuous variables, provide confidence intervals, chi-square tests, p-values and any other relevant and material test. Determine if model development data, validation data, test data or other data was used for these tests.</td>
</tr>
<tr>
<td>B.4.i</td>
<td>Obtain a description how the model was tested for stability over time.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>B.4.j</td>
<td>Obtain a narrative on how were potential concerns with overfitting were addressed.</td>
</tr>
<tr>
<td>B.4.k</td>
<td>Obtain support demonstrating that the GLM assumptions are appropriate.</td>
</tr>
<tr>
<td>B.4.l</td>
<td>Obtain 5-10 sample records with corresponding output from the model for those records.</td>
</tr>
</tbody>
</table>

### 5. “Old Model” Versus “New Model”

<table>
<thead>
<tr>
<th>B.5.a</th>
<th>Obtain an explanation why this model is an improvement to the current rating plan. If it replaces a previous model, find out why it is better than the one it is replacing; determine how the company reached that conclusion and identify metrics relied on in reaching that conclusion. Look for an explanation of any changes in calculations, assumptions, parameters, and data used to build this model from the previous model.</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>B.5.b</td>
<td>Determine if two Gini coefficients were compared and obtain a narrative on the conclusion drawn from this comparison.</td>
<td>3</td>
</tr>
<tr>
<td>B.5.c</td>
<td>Determine if double lift charts analyzed and what conclusion was drawn from this analysis?</td>
<td>2</td>
</tr>
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</tr>
<tr>
<td>B.5.d</td>
<td>If replacing an existing model, obtain a list of any predictor variables used in the old model that are not used in the new model. Obtain an explanation why these variables were dropped from the new model. Obtain a list of all new predictor variables in the model that were not in the prior model.</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Useful to differentiate between old and new variables so the regulator can prioritize more time on factors not yet reviewed.</td>
<td></td>
</tr>
<tr>
<td>6. Modeler Software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B.6.a</td>
<td>Request access to SMEs (e.g., modelers) who led the project, compiled the data, built the model, and/or performed peer review.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>The filing should contain a contact that can put the regulator in touch with appropriate SMEs to discuss the model.</td>
<td></td>
</tr>
</tbody>
</table>
## C. The Filed Rating Plan

<table>
<thead>
<tr>
<th>Section</th>
<th>Information Element</th>
<th>Level of Importance to Reviewer’s Review</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General Impact of Model on Rating Algorithm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.1.a</td>
<td>In the actuarial memorandum or explanatory memorandum, for each model and sub-model (including external models), look for a narrative that explains each model and its role in the rating system.</td>
<td>1</td>
<td>This item is particularly important, if the role of the model cannot be immediately discerned by the reviewer from a quick review of the rate and/or rule pages. (Importance is dependent on state requirements and ease of identification by the first layer of review and escalation to the appropriate review staff.)</td>
</tr>
<tr>
<td>C.1.b</td>
<td>Obtain an explanation of how the model was used to adjust the rating algorithm.</td>
<td>1</td>
<td>Models are often used to produce factor-based indications, which are then used as the basis for the selected changes to the rating plan. It is the changes to the rating plan that create impacts. Consider asking for an explanation of how the model was used to adjust the rating algorithm.</td>
</tr>
<tr>
<td>C.1.c</td>
<td>Obtain a complete list of characteristics/variables used in the proposed rating plan, including those used as input to the model (including sub-models and composite variables) and all other characteristics/variables (not input to the model) used to calculate a premium. For each characteristic/variable, determine if it is only input to the model, whether it is only a separate univariate rating characteristic, or whether it is both input to the model and a separate univariate rating characteristic. The list should include transparent descriptions (in plain language) of each listed characteristic/variable.</td>
<td>1</td>
<td>Examples of variables used as inputs to the model and used as separate univariate rating characteristics might be criteria used to determine a rating tier or household composite characteristic.</td>
</tr>
<tr>
<td>2. Relevance of Variables and Relationship to Risk of Loss</td>
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<tr>
<td>C.2.a</td>
<td>Obtain a narrative how the characteristics/rating variables, included in the filed rating plan, logically and intuitively relate to the risk of insurance loss (or expense) for the type of insurance product being priced.</td>
<td>2</td>
<td>The narrative should include a discussion of the relevance each characteristic/rating variable has on consumer behavior that would lead to a difference in risk of loss (or expense). The narrative should include a logical and intuitive relationship to cost, and model results should be consistent with the expected direction of the relationship. This explanation would not be needed if the connection between variables and risk of loss (or expense) has already been illustrated.</td>
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### 3. Comparison of Model Outputs to Current and Selected Rating Factors

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<tr>
<td>C.3.a</td>
<td>Compare relativities indicated by the model to both current relativities and the insurer's selected relativities for each risk characteristic/variable in the rating plan.</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>“Significant difference” may vary based on the risk characteristic/variable and context. However, the movement of a selected relativity should be in the direction of the indicated relativity; if not, an explanation is necessary as to why the movement is logical.</td>
<td></td>
</tr>
<tr>
<td>C.3.b</td>
<td>Obtain documentation and support for all calculations, judgments, or adjustments that connect the model's indicated values to the selected values.</td>
<td>1</td>
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<td></td>
<td>The documentation should include explanations for the necessity of any such adjustments and explain each significant difference between the model's indicated values and the selected values. This applies even to models that produce scores, tiers, or ranges of values for which indications can be derived. This information is especially important if differences between model indicated values and selected values are material and/or impact one consumer population more than another.</td>
<td></td>
</tr>
<tr>
<td>C.3.c</td>
<td>For each characteristic/variable used as both input to the model (including sub-models and composite variables) and as a separate univariate rating characteristic, obtain a narrative how each was tempered or adjusted to account for possible overlap or redundancy in what the characteristic/variable measures.</td>
<td>2</td>
</tr>
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<td></td>
<td>Modeling loss ratio with these characteristics/variables as control variables would account for possible overlap. The insurer should address this possibility or other considerations, e.g., tier placement models often use risk characteristics/variables that are also used elsewhere in the rating plan. One way to do this would be to model the loss ratios resulting from a process that already uses univariate rating variables. Then the model/composite variables would be attempting to explain the residuals.</td>
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### 4. Responses to Data, Credibility and Granularity Issues

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<tr>
<td>C.4.a</td>
<td>Determine what, if any, consideration was given to the credibility of the output data.</td>
<td>2</td>
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<tr>
<td></td>
<td>At what level of granularity is credibility applied. If modeling was by-coverage, by-form or by-peril, explain how these were handled when there was not enough credible data by coverage, form or peril to model.</td>
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<tr>
<td>C.4.b</td>
<td>If the rating plan is less granular than the model, obtain an explanation why.</td>
<td>2</td>
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<td></td>
<td>This is applicable if the insurer had to combine modeled output in order to reduce the granularity of the rating plan.</td>
<td></td>
</tr>
<tr>
<td>C.4.c</td>
<td>If the rating plan is more granular than the model, obtain an explanation why.</td>
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<tr>
<td></td>
<td>A more granular rating plan implies that the insurer had to extrapolate certain rating treatments, especially at the tails of a distribution of attributes, in a manner not specified by the model indications.</td>
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</table>
5. Definitions of Rating Variables

| C.5.a | Obtain a narrative on adjustments made to raw data, e.g., transformations, binning and/or categorizations. If adjustments were made, obtain the name of the characteristic/variable and a description of the adjustment. | 2 |
| C.5.b | Obtain a complete list and description of any rating tiers or other intermediate rating categories that translate the model outputs into some other structure that is then presented within the rate and/or rule pages. | 1 |

6. Supporting Data

| C.6.a | Obtain aggregated state-specific, book-of-business-specific univariate historical experience data, separately for each year included in the model, consisting of, at minimum, earned exposures, earned premiums, incurred losses, loss ratios and loss ratio relativities for each category of model output(s) proposed to be used within the rating plan. For each data element, obtain an explanation whether it is raw or adjusted and, if the latter, obtain a detailed explanation for the adjustments. | 3 |
| C.6.b | Obtain an explanation of any material (especially directional) differences between model indications and state-specific univariate indications. | 3 |

For example, were losses developed/undeveloped, trended/untrended, capped/uncapped, etc? Univariate indications should not necessarily be used to override more sophisticated multivariate indications. However, they do provide additional context and may serve as a useful reference.

Multivariate indications may be reasonable as refinements to univariate indications, but possibly not for bringing about significant reversals of those indications. For instance, if the univariate indicated relativity for an attribute is 1.5 and the multivariate indicated relativity is 1.25, this is potentially a plausible application of the multivariate techniques. If, however, the univariate indicated relativity is 0.7 and the multivariate indicated relativity is 1.25, a regulator may question whether the attribute in question is negatively correlated with other determinants of risk. Credibility of state data should be considered when state indications differ from modeled results based on a broader data set. However, the relevance of the broader data set to the risks being priced should also be considered. Borderline reversals are not of as much concern.
7. Consumer Impacts

<table>
<thead>
<tr>
<th></th>
<th>Obtain a listing of the top five rating variables that contribute the most to large swings in premium, both as increases and decreases.</th>
<th>2</th>
<th>These rating variables may represent changes to rate relativities, be newly introduced to the rating plan, or have been removed from the rating plan.</th>
</tr>
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<tbody>
<tr>
<td>C.7.a</td>
<td>Determine if the insurer performed sensitivity testing to identify significant changes in premium due to small or incremental change in a single risk characteristic. If such testing was performed, obtain a narrative that discusses the testing and provides the results of that testing.</td>
<td>3</td>
<td>One way to see sensitivity is to analyze a graph of each risk characteristic's/variable's possible relativities. Look for significant variation between adjacent relativities and evaluate if such variation is reasonable and credible.</td>
</tr>
<tr>
<td>C.7.b</td>
<td>For the proposed filing, obtain the impacts on expiring policies and describe the process used by management, if any, to mitigate those impacts.</td>
<td>2</td>
<td>Some mitigation efforts may substantially weaken the connection between premium and expected loss and expense, and hence may be viewed as unfairly discriminatory by some states.</td>
</tr>
<tr>
<td>C.7.c</td>
<td>Obtain a rate disruption/dislocation analysis, demonstrating the distribution of percentage impacts on renewal business (create by rerating the current book of business).</td>
<td>2</td>
<td>The analysis should include the largest dollar and percentage impacts arising from the filing, including the impacts arising specifically from the adoption of the model or changes to the model as they translate into the proposed rating plan.</td>
</tr>
<tr>
<td>C.7.d</td>
<td>Obtain exposure distributions for the model's output variables and show the effects of rate changes at granular and summary levels.</td>
<td>3</td>
<td>See Appendix C for an example of an exposure distribution.</td>
</tr>
<tr>
<td>C.7.e</td>
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</table>
C.7.f Identify policy characteristics, used as input to a model or sub-model, that remain "static" over a policy's lifetime versus those that will be updated periodically. Obtain a narrative on how the company handles policy characteristics that are listed as "static," yet change over time.

Some examples of "static" policy characteristics are prior carrier tenure, prior carrier type, prior liability limits, claim history over past X years, or lapse of coverage. These are specific policy characteristics usually set at the time new business is written, used to create an insurance score or to place the business in a rating/underwriting tier, and often fixed for the life of the policy. The reviewer should be aware, and possibly concerned, how the company treats an insured over time when the insured’s risk profile based on "static" variables changes over time but the rate charged, based on a new business insurance score or tier assignment, no longer reflect the insured’s true and current risk profile.

A few examples of "non-static" policy characteristics are age of driver, driving record and credit information (FCRA related). These are updated automatically by the company on a periodic basis, usually at renewal, with or without the policyholder explicitly informing the company.

C.7.g Obtain a means to calculate the rate charged a consumer.

The filed rating plan should contain enough information for a regulator to be able to validate policy premium. However, for a complex model or rating plan, a score or premium calculator via Excel or similar means would be ideal, but this could be elicited on a case-by-case basis. Ability to calculate the rate charged could allow the regulator to perform sensitivity testing when there are small changes to a risk characteristic/variable. Note that this information may be proprietary.

8. Accurate Translation of Model into a Rating Plan

C.8.a Obtain sufficient information to understand how the model outputs are used within the rating system and to verify that the rating plan, in fact, reflects the model output and any adjustments made to the model output.

<table>
<thead>
<tr>
<th>Description</th>
<th>Notes</th>
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<tr>
<td>Identify policy characteristics, used as input to a model or sub-model, that remain &quot;static&quot; over a policy's lifetime versus those that will be updated periodically. Obtain a narrative on how the company handles policy characteristics that are listed as &quot;static,&quot; yet change over time.</td>
<td>3</td>
</tr>
<tr>
<td>Some examples of &quot;static&quot; policy characteristics are prior carrier tenure, prior carrier type, prior liability limits, claim history over past X years, or lapse of coverage. These are specific policy characteristics usually set at the time new business is written, used to create an insurance score or to place the business in a rating/underwriting tier, and often fixed for the life of the policy. The reviewer should be aware, and possibly concerned, how the company treats an insured over time when the insured’s risk profile based on &quot;static&quot; variables changes over time but the rate charged, based on a new business insurance score or tier assignment, no longer reflect the insured’s true and current risk profile. A few examples of &quot;non-static&quot; policy characteristics are age of driver, driving record and credit information (FCRA related). These are updated automatically by the company on a periodic basis, usually at renewal, with or without the policyholder explicitly informing the company.</td>
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</tr>
<tr>
<td>Obtain sufficient information to understand how the model outputs are used within the rating system and to verify that the rating plan, in fact, reflects the model output and any adjustments made to the model output.</td>
<td>1</td>
</tr>
</tbody>
</table>
VIII. PROPOSED CHANGES TO THE PRODUCT FILING REVIEW HANDBOOK

TBD – placeholder to include best practices for review of predictive models and analytics filed by insurers to justify rates.

The Task Force was charged to propose modifications to the 2016 Product Filing Review Handbook to reflect best practices for the regulatory review of predictive analytics. The following are the titled sections in Chapter Three “The Basics of Property and Casualty Rate Regulation.” Proposed changes are shown as tracked changes.


CHAPTER THREE

The Basics of Property and Casualty Rate Regulation

No changes are proposed to the following sections at the beginning of Chapter Three: Introduction; Rating Laws; Rate Standards; Rate Justification and Supporting Data; Number of Years of Historical Data; Segregation of Data; Data Adjustments; Premium Adjustments; Losses and LAE (perhaps just DCC) Adjustments; Catastrophe or Large Loss Provisions; Loss Adjustment Expenses; Data Quality; Rate Justification: Overall Rate Level; Contingency Provision; Credibility; Calculation of Overall Rate Level Need: Methods (Pure Premium and Loss Ratio Methods); Rate Justification: Rating Factors; Calculation of Deductible Rating Factors; Calculation of Increased Limit Factors; and Credibility for Rating Factors.

Interaction between Rating Variables (Multivariate Analysis)

If the pricing of rating variables is evaluated separately for each rating variable, there is potential to miss the interaction between rating variables. Care should be taken to have a multivariate analysis when practical. In some instances, a multivariate analysis is not possible. But, with computing power growing exponentially, insurers are finding many ways to improve their operations and competitiveness through use of very complex predictive models in all areas of their insurance business.

Approval of Classification Systems

With rate changes, companies sometimes propose revisions to their classification system. Because the changes to classification plans can be significant and have large impacts on the consumers’ rates, regulators should focus on these changes.

Some items of proposed classification can sometimes be deemed to be against public policy, such as the use of education or occupation. You should be aware of your state’s laws and regulations regarding which rating factors are allowed. Finding rating or underwriting characteristics that may violate public policy is becoming more difficult for regulators with the increasing and innovative ways insurers use predictive models.

Rating Tiers

Some states allow an insurer to have multiple rate levels, or rating tiers, within a single company. These rating tiers are another way of classifying risks for rating purposes. Typically, there are requirements for rating tiers: the underwriting rules for each tier should be mutually exclusive, clear, and objective; there should be a distinction between the expected losses or expenses for each tier; and the placement process should be auditable. Tiers within a company are mainly seen in personal lines products.

One particular concern with rating tiers would be the analyses of whether a plan produces unfair discrimination. Questions arise around the time-sensitive aspects of the underwriting criteria and any related re-evaluation of the tiers upon renewal. For example, consider two tiers where the insured is placed in the “high” tier because of a lapse of insurance in the prior 12 months. The question is: What happens upon renewal after there has no longer been a lapse of insurance for 12 months? Does the insured get slotted in the “low” tier as he would if he was new business? Some statutes limit the amount of time that violations, loss history, or insurance scores can be used, and some statutes might only allow credit history to be used for re-
rating at the policyholder’s request. Regulators should consider the acceptability of differences in rates between existing and new policyholders when they have the same current risk profile.

Insurers also can create different rating levels by having separate companies within a group. While regulators should examine rating tiers within an insurer to a high degree of regulatory scrutiny, there tends to be less scrutiny with differences in rates that exist between affiliated companies. Workers’ compensation insurers are more likely to obtain rating tiers using separate companies.

**Rate Justification: New Products** – (No change is proposed.)

### Predictive Modeling

The ability of computers to process massive amounts of data has led to the expansion of the use of predictive modeling in insurance ratemaking. Predictive models have enabled insurers to build rating, marketing, underwriting and claim models with significant segmentation/predictive power and are increasingly being applied in such areas as claims modeling and used in helping insurers to price risks more effectively.

**Key new rating variables that are being incorporated into insurers’ predictive models include homeowners’ rates by peril, homeowners rating by building characteristics, vehicle history, usage-based auto insurance, and credit characteristics.**

Data quality within and communication about models are of key importance with predictive modeling. Depending on definitional boundaries, predictive modeling can sometimes overlap with the field of machine learning. In the modeling space, predictive modeling is often referred to as predictive analytics.

Insurers’ use of predictive analytics along with big data has significant potential benefits to both consumers and insurers. Predictive analytics can reveal insights into the relationship between consumer behavior and the cost of insurance, lower the cost of insurance for many, and provide incentives for consumers to better control and mitigate loss. However, predictive analytic techniques are evolving rapidly and leaving many regulators without the necessary tools to effectively review insurers’ use of predictive models in insurance applications. To aid the regulator in the review of predictive models, best practices have been developed along with specific information that will aid the regulator in their review of predictive models (specifically generalized linear models or “GLMs”) for private passenger automobile and homeowners’ insurance applications.

The term ‘predictive model’ refers to a set of models that use statistics to predict outcomes. Then applied to insurance, the model is chosen to estimate the probability or expected value of an outcome given a set amount of input data; for example, models can predict the frequency of loss, the severity of loss, or the pure premium.

To further complicate regulatory review of models in the future, modeling methods are evolving rapidly and not limited just to GLMs. As computing power grows exponentially, it is opening up the modeling world to more sophisticated forms of data acquisition and data analysis. Insurance actuaries and data scientists seek increased predictiveness by using even more complex predictive modeling methods. Examples of these are predictive models utilizing random forests, decision trees, neural networks, or combinations of available modeling methods (often referred to as ensembles). These evolving techniques will make the regulators’ understanding and oversight of filed rating plans incorporating predictive models even more challenging.

#### A. Generalized Linear Models

The generalized linear model (GLM) is a commonly used predictive model in insurance applications, particularly in building an insurance product’s rating plan. Because of this and the fact most Property and Casualty regulators are most concerned about personal lines, NAIC has developed a white paper for guidance in reviewing GLMs for Home and private passenger automobile insurance.

Before GLMs became vogue, rating plans were built using univariate methods. Univariate methods were considered rational and easy to demonstrate the relationship to costs (loss and/or expense). However, many consider univariate methods too simplistic since they do not take into account the interaction (or dependencies) of the selected input variables. GLMs introduce significant improvements over univariate-based rating plans by automatically adjusting for correlations among...
input variables. Today, the majority of predictive models used in private passenger automobile and home insurance rating plans are GLMs. But, GLM results are not always rational and the relationship to costs may be difficult to explain.

A GLM consists of three elements:

- Each component of Y is independent and a probability distribution from the exponential family, or more generally, a selected variance function and dispersion parameter.
- A linear predictor η = Xi.
- A link function g such that E(Y) = μ = g⁻¹(η).

As can be seen in the description of the three GLM components above, it may take more than a casual introduction to statistics to comprehend the construction of a GLM. As stated earlier, a downside to GLMs is that it is more challenging to interpret the GLMs output than with univariate models.

B. Credibility of Model Output

GLM software provides point estimates and allows the modeler to consider standard errors and confidence intervals. GLM output is typically assumed to be 100% credible no matter the size of the underlying data set. If some segments have little data, the resulting uncertainty would not be reflected in the GLM parameter estimates themselves (although it might be reflected in the standard errors, confidence intervals, etc.). Even though the process of selecting relativities often includes adjusting the raw GLM output, the resultant selections are not then credibility-weighted with any complement of credibility. Nevertheless, selected relativities based on GLM model output may differ from GLM point estimates.

Because of this presumption in credibility, which may or may not be valid in practice, the modeler and the regulator reviewing the model would need to engage in thoughtful consideration when incorporating GLM output into a rating plan to ensure that model predictiveness is not compromised by any lack of actual credibility. Therefore, to mitigate the risk that model credibility or predictiveness is lacking, a complete filing for a rating plan that incorporates GLM output should include validation evidence for the rating plan, not just the statistical model.

C. What is a “Best Practice”?

A best practice is a form of program evaluation in public policy. At its most basic level, a practice is a “tangible and visible behavior… [based on] an idea about how the actions… will solve a problem or achieve a goal.” Best practices can maintain quality as an alternative to mandatory legislated standards and can be based on self-assessment or benchmarking. Therefore, a best practice represents an effective method of problem solving. The "problem" regulators want to solve is probably better posed as seeking an answer to this question: How can regulators determine that predictive models, as used in rate filings, are compliant with state laws and regulations? However, best practices are not intended to create standards for filings that include predictive models.

Best practices are based on the following principles that promote a comprehensive and coordinated review of predictive models across states:

- State insurance regulators will maintain their current rate regulatory authority.
- State insurance regulators will be able to share information to aid companies in getting insurance products to market more quickly.
- State insurance regulators will share expertise and discuss technical issues regarding predictive models.
- State insurance regulators will maintain confidentiality, where appropriate, regarding predictive models.

D. Regulatory Review of Predictive Models

The knowledge needed to review predictive models, and guidance regarding GLMs for personal automobile and home insurance may be transferable when the review involves GLMs applied to other lines of business. Modeling depends on context, so the GLM reviewer has to be alert for data challenges and business applications that differ from the most familiar personal lines. For example, compared to personal lines, modeling for rates in commercial lines is more likely to encounter

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low volumes of historical data, dependence on advisory loss costs, unique large accounts with some large deductibles and products that build policies from numerous line-of-business and coverage building blocks. Commercial lines commonly use individual risk modifications following experience, judgment, and/or expense considerations. A regulator may never see commercial excess and surplus lines filings. The legal and regulatory constraints (including state variations) are likely to be more evolved, and challenging, in personal lines. A GLM rate model for personal lines in 2019 is either an update or a late-adopter's defensive tactic. Adopting GLM for commercial lines has a shorter history.

Guidance offered here might be useful (with deeper adaptations) when starting to review different types of predictive models. If the model is not a GLM, some listed items might not apply. Not all predictive models generate p-values or F tests. Depending on the model type, other considerations might be important. When transferring guidance to other lines of business and other types of model, unique considerations may arise depending on the context in which a predictive model is proposed to be deployed, the uses to which it is proposed to be put, and the potential consequences for the insurer, its customers and its competitors. This guidance does not delve into these possible considerations but regulators should be prepared to address them as they arise.

Best practices will help the regulator understand if a predictive model is cost based, if the predictive model is compliant with state law, and how the model improves the company’s rating plan. Best practices can, also, make the regulator's review more consistent across states and more efficient, and assist companies in getting their products to market faster. With this in mind, the regulator's review of predictive models should:

1. Ensure that the factors developed based on the model produce rates that are not excessive, inadequate, or unfairly discriminatory.
   a. Review the overall rate level impact of the revisions proposed based on the predictive model output in comparison to rate level indications provided by the filer.
   b. Review the premium disruption for individual policyholders and how the disruptions can be explained to individual consumers.
   c. Review the individual input characteristics to and output factors from the predictive model (and its sub-models), as well as, associated selected relativities to ensure they are not unfairly discriminatory.

2. Thoroughly review all aspects of the model including the source data, assumptions, adjustments, variables, and resulting output.
   a. Determine that individual input characteristics to a predictive model are related to the expected loss or expense differences in risk. Each input characteristic should have an intuitive or demonstrable actual relationship to expected loss or expense.
   b. Determine that the data used as input to the predictive model is accurate, including a clear understanding how missing values, erroneous values and outliers are handled.
   c. Determine that any adjustments to the raw data are handled appropriately, including but not limited to, trending, development, capping, removal of catastrophes.
   d. Determine that rating factors from a predictive model are related to expected loss or expense differences in risk. Each rating factor should have a demonstrable actual relationship to expected loss or expense.
   e. Obtain a clear understanding how often each risk characteristic, used as input to the model, is updated and whether the model is periodically rerun, so model output reflects changes to non-static risk characteristics.

3. Evaluate how the model interacts with and improves the rating plan.
   a. Obtain a clear understanding of the characteristics that are input to a predictive model (and its sub-models), their relationship to each other and their relationship to non-modeled characteristics/variables used to calculate a risk’s premium.
   b. Obtain a clear understanding of how the selected predictive model was built and why the insurer believes this type of model works in a private passenger automobile or homeowner’s insurance risk application.
   c. Obtain a clear understanding of how model output interacts with non-modeled characteristics/variables used to calculate a risk’s premium.
   d. Obtain a clear understanding of how the predictive model was integrated into the insurer’s state rating plan and how it improves that plan.
   e. For predictive model refreshes, determine whether sufficient validation was performed to ensure the model is still a good fit.
4. Enable competition and innovation to promote the growth, financial stability, and efficiency of the insurance marketplace.
   a. Enable innovation in the pricing of insurance through acceptance of predictive models, provided they are actuarially sound and in compliance with state laws.
   b. Protect the confidentiality of filed predictive models and supporting information in accordance with state law.
   c. Review predictive models in a timely manner to enable reasonable speed to market.

E. Information Needed to Follow Best Practices

To assist the regulator in following each best practice, the Casualty Actuarial and Statistical Task Force created a white paper titled *Regulatory Review of Predictive Models*. The paper contains a list of information elements and considerations that should be useful during the review of a model underlying a rating plan. To further assist the regulator, the information elements were mapped into the best practices listed above in Section XV of the paper.

F. Confidentiality

Regulatory reviewers are required to protect confidential information in accordance with applicable State law. However, insurers should be aware that a rate filing might become part of the public record. Each state determines the confidentiality of a rate filing, supplemental material to the filing, when filing information might become public, the procedure to request that filing information be held confidentially, and the procedure by which a public records request is made. It is incumbent on an insurer to be familiar with each state’s laws regarding the confidentiality of information submitted with their rate filing.

Advisory Organizations – (No change is proposed.)

Workers’ Compensation Special Rules – (No change is proposed.)

Premium Selection Decisions

- Indicated Rate Change vs. Selected Rate Change

After applying credibility, the indicated rate change should reflect the company’s best estimate of their premium needs given their current or expected book of business. However, insurance companies also have other business considerations including competition, marketing, legal concerns, impact of the rate change on retention, etc. A company might wish to deviate from their indicated rate change and should justify those decisions, within the constraints of the law.

- Capping and Transition Rules

With advances in technology, it is possible for companies to introduce capping of rates on individual policies with an aim toward gradually increasing policyholders’ rates, rather than making large modifications all at one time. Similarly, premiums are often proposed to be modified when an insurer acquires another company’s book of business or decides to move from or to an advisory organization’s plan. These types of proposed capping are sometimes called “renewal premium capping,” “rate capping,” “a rate stability program,” or “transition rules.”

Transition rules for individual policyholders can get quite complex and you need to be aware of your state’s positions on premium capping rules. Any premium capping and transition rules require weighing the pros and cons of the potential for unfair discrimination (with some customers not paying the rate commensurate with the risks they have) vs. rate stability for existing policyholders.

If premium capping or transition rules are allowed, additional decisions will need to be made:

- Which rates should get capped?
- Do rate decreases get capped? If so, what is the impact if the policyholder asks to be quoted as new business?
- Do all rate increases get capped or only above a certain percentage?
- How much time will lapse or how many renewal cycles will occur before the new rates are in place or different rating plans are merged?
- Should the insured be told what the final premium will be once no more capping is applied?
- How would exposure change be addressed? If the policyholder buys a new car or changes their liability limits, what is the impact on their rate capping?
How many rate-capping rules can be implemented at any given time?

When premium capping or transition rules have been incorporated, future indicated rate changes and rating factor analyses need to properly reflect the fully approved rate changes. If the overall approved rate change was +10%, yet capping resulted in only 8% being implemented in the first year, the remaining amount to recognize the full 10% should be reflected in the premium on-level adjustment. Otherwise, the indicated rate would be redundant.

Some states encourage more frequent filing of rate changes that can help to avoid the need of premium capping and transition rules. Some states might prefer capping of individual rating variables, rather than capping for individual policyholders.

**Installment Plans** – (No change is proposed.)

**Policy Fees** – (No change is proposed.)

**Potential Questions to Ask Oneself as a Regulator**

Every filing will be different and will result in different regulatory analyses. But the following are some questions the regulator might ask oneself in a rate filing review:

1. Regarding data:
   a. Is the data submitted with the filing enough information for a regulatory review?
   b. Is the number of years of experience appropriate?
   c. Did the company sufficiently analyze and control their quality of data?

2. Regarding the support and justification of rates:
   a. Did they propose rate changes without justification?
   b. Are proposals based on judgment or competitive analysis? If so, are the results reasonable and acceptable? Are there inappropriate marketing practices?
   c. Are the assumptions (loss development, trend, expense load, profit provision, credibility etc.) used to develop the rate indication appropriate? Are they supported with data and are deviations from data results sufficiently explained?
   d. Is the weighting of data by year (or credibility) properly justified or does it appear random?
      - Is there more weight being placed on data in one year solely because it produces a higher indicated rate change?
      - If there are two indications being weighted together and one is for a rate increase and one is for a rate decrease, is the weighting justified?
   c. Is there satisfactory explanation about why a proposed rate change deviates from the indicated rate change?

3. Regarding differences in assumptions from previous filings:
   a. Have methodologies changed significantly?
   b. Are assumptions for the weighting of years or credibility significantly different? Or does there appear to be some manipulation to the rate indication?

4. Is there unfair discrimination?
   a. Do classifications comply with state requirements?
   b. Are proposed rates established so that different classes will produce the same underwriting results?
c. If predictive models are used in the rating plan, are there concerns related to input variables that are prohibited or proxies for prohibited variables?

5. What do you need to communicate?
   a. Can you explain why you are taking a specific action on the filing?
   b. What do you need to tell the Consumer Services Department?
      • Can you explain the impact of the rate change on current business? How big is the company and how much of the market is impacted?
      • What are the biggest changes in the filing (and the ones on which consumer calls might be expected)?
      • What is the maximum rate change impact on any one policyholder?

Questions to Ask a Company

If you remain unsatisfied that the company has satisfactorily justified the rate change, then consider asking additional questions of the company. Questions should be asked of the company when they have not satisfied statutory or regulatory requirements in the state or when any current justification is inadequate and could have an impact on the rate change approval or the amount of the approval.

If there are additional items of concern, the company can be notified so they will make appropriate modifications in future filings.

The CASTF white paper, Regulatory Review of Predictive Models, documents questions that a regulator may want to ask when reviewing a model. These questions are listed in the Predictive Model – Information for Regulatory Review section of the white paper. Note that although the white paper focuses on GLMs for home and private passenger auto insurance, some of the concepts may be transferable to other types of models and/or other lines of business.

Additional Ratemaking Information

The Casualty Actuarial Society (CAS) and the Society of Actuaries (SOA) have extensive examination syllabi that contains a significant amount of ratemaking information, on both the basic topics covered in this chapter and on advanced ratemaking topics. The CAS and SOA websites contains links to many of the papers included in the syllabi. Recommended reading is the Foundations of Casualty Actuarial Science, which contains chapters on ratemaking, risk classification, and individual risk rating.

Other Reading

Some additional background reading is recommended:

  o Chapter 1: Introduction
  o Chapter 3: Ratemaking
  o Chapter 6: Risk Classification
  o Chapter 9: Investment Issues in Property-Liability Insurance
  o Chapter 10: Only the section on Regulating an Insurance Company, pp. 777–787
- Casualty Actuarial Society (CAS) Statements of Principles, especially regarding property and casualty ratemaking.
- Association of Insurance Compliance Professionals: “Ratemaking—What the State Filer Needs to Know.”
- Review of filings and approval of insurance company rates.

Summary
Rate regulation for property/casualty lines of business requires significant knowledge of state rating laws, rating standards, actuarial science, statistical modeling and many data concepts.

- Rating laws vary by state, but the rating laws are usually grouped into prior approval, file and use or use and file (competitive), no file (open competition), and flex rating.
- Rate standards typically included in the state rating laws require that “Rates shall not be inadequate, excessive, or unfairly discriminatory.”
- A company will likely determine their indicated rate change by starting with historical years of underwriting data (earned premiums, incurred loss and loss adjustment expenses, general expenses) and adjusting that data to reflect the anticipated ultimate level of costs for the future time period covered by the policies. Numerous adjustments are made to the data. Common premium adjustments are on-level premium, audit, and trend. Common loss adjustments are trend, loss development, Catastrophe/large loss provisions, and an adjusting and other (A&O) loss adjustment expense provision. A profit/contingency provision is also calculated to determine the indicated rate change.
- Once an overall rate level is determined, the rate change gets allocated to the classifications and other rating factors.
- Individual risk rating allows manual rates to be modified by an individual policyholder’s own experience.
- Advisory organizations provide the underlying loss costs for companies to be able to add their own expenses and profit provisions (with loss cost multipliers) to calculate their insurance rates.
- Casualty Actuarial Society’s Statement of Principles Regarding Property and Casualty Insurance Ratemaking provides guidance and guidelines for the numerous actuarial decisions and standards employed during the development of rates.
- NAIC model laws also include special provisions for workers’ compensation business, penalties for not complying with laws, and competitive market analysis to determine whether rates should be subject to prior approval provisions.
- Best practices for reviewing predictive models are provided the CASTF white paper titled Regulatory Review of Predictive Models. Although the white paper focuses on GLMs for home and private passenger automobile insurance, some of the concepts may be transferrable to other types of models and/or other lines of insurance.

While this chapter provides an overview of the rate determination/actuarial process and regulatory review, state statutory or administrative rule may require the examiner to adopt different standards or guidelines than the ones described.

No additional changes are proposed to the Product Filing Review Handbook.

IX. PROPOSED STATE GUIDANCE

TBD—placeholder for guidance for rate filings that are based on predictive model

This paper acknowledges that different states will apply the guidance within it differently, based on variations in the legal environment pertaining to insurance regulation in those states, as well as the extent of available resources, including staff members with actuarial and/or statistical expertise, the workloads of those staff members, and the time that can be reasonably allocated to predictive-model reviews. States with prior-approval authority over personal-lines rate filings often already require answers in connection with many of the information elements expressed in this paper. However, states – including those with and without prior-approval authority – may also use the guidance in this paper to choose which model elements to focus on in their reviews and/or to train new reviewers, as well as to gain an enhanced understanding of how predictive models are developed, supported, and deployed in their markets. Ultimately, the insurance regulators within each state will decide how best to tailor the guidance within this paper to achieve the most effective and successful implementation, subject to the framework of statutes, regulations, precedents, and processes that comprise the insurance regulatory framework in that state.

X. OTHER CONSIDERATIONS

During the development of this guidance, topics arose that are not addressed in this paper. These topics may need addressing during the regulator’s review of a predictive model. A few of these issues may be discussed elsewhere within NAIC. All of these issues, if addressed, will be handled by each state on a case-by-case basis. A sampling of topics for consideration in this section include:
• TBD: When are rating variables or rating plans too granular? How is granularity handled during the development of the model and during the selection of rate relativities file in a rating plan supported by a model?
• TBD: Discuss the scientific mindset of open inquiry and its relevance to the best practice white paper.
• TBD: Discuss correlation vs causality in general and in relation to ASOP 12.
• TBD: Will following guidance provided in this white paper increase or pressure state regulatory budgets adversely?
• TBD: Discussion of data mining being in conflict with standard scientific model and increase in "false positives."
• TBD: Explain how the insurer will help educate consumers to mitigate their risk.
• TBD: Identify sources to be used at "point of sale" to place individual risks within the matrix of rating system classifications. How can a consumer verify their own "point-of-sale" data and correct any errors?
• TBD: Discuss cost to filing company and state to have expertise and resources adequate to document and review all knowledge elements identified in this white paper.
• Other TBDs

XI. RECOMMENDATIONS GOING FORWARD

The following are examples of topics that may be included in the recommendations:
• TBD: Discuss confidentiality as it relates to filings submitted via SERFF
• TBD: Discuss confidentiality as it relates to state statutes and regulations.
• TBD: Discuss policyholder disclosure when complex predictive model underlies a rating plan.
• TBD: Discuss the need for NAIC to update and strengthen information-sharing platforms and protocols.
• TBD: Determine the means available to a consumer to correct or contest individual data input values that may be in error.
• TBD: Given an insurer’s rating plan relies on a predictive model and knowing all characteristics of a risk, discuss a regulator’s ability/need to audit/calculate the risk’s premium without consultation with the insurer.
• Other TBDs
XI. APPENDIX A – BEST PRACTICE DEVELOPMENT

Best-practices development is a method for reviewing public policy processes that have been effective in addressing particular issues and could be applied to a current problem. This process relies on the assumptions that top performance is a result of good practices and these practices may be adapted and emulated by others to improve results. The term “best practice” can be a misleading one due to the slippery nature of the word “best”. When proceeding with policy research of this kind, it may be more helpful to frame the project as a way of identifying practices or processes that have worked exceptionally well and the underlying reasons for their success. This allows for a mix-and-match approach for making recommendations that might encompass pieces of many good practices.

Researchers have found that successful best-practice analysis projects share five common phases:

A. **Scope**
   
The focus of an effective analysis is narrow, precise and clearly articulated to stakeholders. A project with a broader focus becomes unwieldy and impractical. Furthermore, Bardach urges the importance of realistic expectations in order to avoid improperly attributing results to a best practice without taking into account internal validity problems.

B. **Identify Top Performers**
   
Identify outstanding performers in this area to partner with and learn from. In this phase, it is key to recall that a best practice is a tangible behavior or process designed to solve a problem or achieve a goal (i.e. reviewing predictive models contributes to insurance rates that are not unfairly discriminatory). Therefore, top performers are those who are particularly effective at solving a specific problem or regularly achieve desired results in the area of focus.

C. **Analyze Best Practices**
   
Once successful practices are identified, analysts will begin to observe, gather information and identify the distinctive elements that contribute to their superior performance. Bardach suggests it is important at this stage to distill the successful elements of the process down to their most essential idea. This allows for flexibility once the practice is adapted for a new organization or location.

D. **Adapt**
   
Analyze and adapt the core elements of the practice for application in a new environment. This may require changing some aspects to account for organizational or environmental differences while retaining the foundational concept or idea. This is also the time to identify potential vulnerabilities of the new practice and build in safeguards to minimize risk.

E. **Implementation and evaluation**
   
The final step is to implement the new process and carefully monitor the results. It may be necessary to make adjustments, so it is likely prudent to allow time and resources for this. Once implementation is complete, continued evaluation is important to ensure the practice remains effective.

---


XIII. APPENDIX B - GLOSSARY OF TERMS

Adjusting Data - TBD
Control Factor - TBD
Data source - TBD
Double-lift chart - TBD
Exponential Family - TBD

Fair Credit Reporting Act – The Fair Credit Reporting Act (FCRA), 15 U.S.C. § 1681 (FCRA) is U.S. Federal Government legislation enacted to promote the accuracy, fairness and privacy of consumer information contained in the files of consumer reporting agencies. It was intended to protect consumers from the willful and/or negligent inclusion of inaccurate information in their credit reports. To that end, the FCRA regulates the collection, dissemination and use of consumer information, including consumer credit information. Together with the Fair Debt Collection Practices Act (FDCPA), the FCRA forms the foundation of consumer rights law in the United States. It was originally passed in 1970 and is enforced by the US Federal Trade Commission, the Consumer Financial Protection Bureau and private litigants.

Generalized Linear Model - TBD

Geodemographic - Geodemographic segmentation (or analysis) is a multivariate statistical classification technique for discovering whether the individuals of a population fall into different groups by making quantitative comparisons of multiple characteristics with the assumption that the differences within any group should be less than the differences between groups. Geodemographic segmentation is based on two principles:

1. People who live in the same neighborhood are more likely to have similar characteristics than are two people chosen at random.
2. Neighborhoods can be categorized in terms of the characteristics of the population that they contain. Any two neighborhoods can be placed in the same category, i.e., they contain similar types of people, even though they are widely separated.

PCA Approach (Principal Component Analysis) – The method creates multiple new variables from correlated groups of predictors. Those new variables exhibit little or no correlation between them—thereby making them potentially more useful in a GLM. A PCA in a filing can be described as “a GLM within a GLM.” One of the more common applications of PCA is geodemographic analysis, where many attributes are used to modify territorial differentials on, for example, a census block level.

Private Passenger Automobile Insurance – TBD

Probability Distribution - TBD

Rating Algorithm – TBD


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Rating Plan – TBD
Rating System – TBD
Scrubbing data - TBD
Sub-Model - any model that provides input into another model.
Univariate Model - TBD
Etc.
XIV. APPENDIX C – SAMPLE RATE-DISRUPTION TEMPLATE

**State Division of Insurance - EXAMPLE for Rate Disruption**

<table>
<thead>
<tr>
<th>Minimum % Change</th>
<th>Maximum % Change</th>
<th>Total Number of Insureds (Auto-Calculated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncapped</td>
<td>Capped (if applicable)</td>
<td></td>
</tr>
<tr>
<td>-30.000%</td>
<td>-15.000%</td>
<td>1994</td>
</tr>
<tr>
<td>-25.000%</td>
<td>30.000%</td>
<td></td>
</tr>
</tbody>
</table>

**Uncapped Rate Disruption**

<table>
<thead>
<tr>
<th>Percent-Change Range</th>
<th>Number of Insureds in Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>-30% to &lt; -25%</td>
<td>2</td>
</tr>
<tr>
<td>-25% to &lt; -20%</td>
<td>90</td>
</tr>
<tr>
<td>-20% to &lt; -15%</td>
<td>130</td>
</tr>
<tr>
<td>-15% to &lt; -10%</td>
<td>230</td>
</tr>
<tr>
<td>-10% to &lt; -5%</td>
<td>340</td>
</tr>
<tr>
<td>-5% to &lt; 0%</td>
<td>245</td>
</tr>
<tr>
<td>Exactly 0%</td>
<td>12</td>
</tr>
<tr>
<td>&gt;0% to &lt; 5%</td>
<td>150</td>
</tr>
<tr>
<td>5% to &lt; 10%</td>
<td>245</td>
</tr>
<tr>
<td>10% to &lt; 15%</td>
<td>401</td>
</tr>
<tr>
<td>15% to &lt; 20%</td>
<td>201</td>
</tr>
<tr>
<td>20% to &lt; 25%</td>
<td>19</td>
</tr>
<tr>
<td>25% to &lt; 30%</td>
<td>12</td>
</tr>
<tr>
<td>30% to &lt; 35%</td>
<td>2</td>
</tr>
</tbody>
</table>

**Capped Rate Disruption (If Applicable)**

<table>
<thead>
<tr>
<th>Percent-Change Range</th>
<th>Number of Insureds in Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>-15% to &lt; -10%</td>
<td>452</td>
</tr>
<tr>
<td>-10% to &lt; -5%</td>
<td>340</td>
</tr>
<tr>
<td>-5% to &lt; 0%</td>
<td>245</td>
</tr>
<tr>
<td>Exactly 0%</td>
<td>12</td>
</tr>
<tr>
<td>&gt;0% to &lt; 5%</td>
<td>150</td>
</tr>
<tr>
<td>5% to &lt; 10%</td>
<td>245</td>
</tr>
<tr>
<td>10% to &lt; 15%</td>
<td>401</td>
</tr>
<tr>
<td>15% to &lt; 20%</td>
<td>201</td>
</tr>
<tr>
<td>20% to &lt; 25%</td>
<td>19</td>
</tr>
<tr>
<td>25% to &lt; 30%</td>
<td>12</td>
</tr>
<tr>
<td>30% to &lt; 35%</td>
<td>2</td>
</tr>
</tbody>
</table>

**EXAMPLE Uncapped Rate Disruption**

![EXAMPLE Uncapped Rate Disruption](image)

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**EXAMPLE** Capped Rate Disruption

![Graph showing number of insureds in different rate percentage ranges](image)

<table>
<thead>
<tr>
<th>Rate Percentage Increase</th>
<th>Uncapped Dollar Change</th>
<th>Corresponding Dollar Increase for Insured Receiving Largest Percentage Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>5%</td>
<td>5.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>10%</td>
<td>10.0%</td>
<td>10.0%</td>
</tr>
<tr>
<td>15%</td>
<td>15.0%</td>
<td>15.0%</td>
</tr>
<tr>
<td>20%</td>
<td>20.0%</td>
<td>20.0%</td>
</tr>
<tr>
<td>25%</td>
<td>25.0%</td>
<td>25.0%</td>
</tr>
<tr>
<td>30%</td>
<td>30.0%</td>
<td>30.0%</td>
</tr>
<tr>
<td>35%</td>
<td>35.0%</td>
<td>35.0%</td>
</tr>
<tr>
<td>40%</td>
<td>40.0%</td>
<td>40.0%</td>
</tr>
<tr>
<td>45%</td>
<td>45.0%</td>
<td>45.0%</td>
</tr>
<tr>
<td>50%</td>
<td>50.0%</td>
<td>50.0%</td>
</tr>
<tr>
<td>55%</td>
<td>55.0%</td>
<td>55.0%</td>
</tr>
<tr>
<td>60%</td>
<td>60.0%</td>
<td>60.0%</td>
</tr>
<tr>
<td>65%</td>
<td>65.0%</td>
<td>65.0%</td>
</tr>
<tr>
<td>70%</td>
<td>70.0%</td>
<td>70.0%</td>
</tr>
<tr>
<td>75%</td>
<td>75.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>80%</td>
<td>80.0%</td>
<td>80.0%</td>
</tr>
<tr>
<td>85%</td>
<td>85.0%</td>
<td>85.0%</td>
</tr>
<tr>
<td>90%</td>
<td>90.0%</td>
<td>90.0%</td>
</tr>
<tr>
<td>95%</td>
<td>95.0%</td>
<td>95.0%</td>
</tr>
<tr>
<td>100%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

**State Division of Insurance - EXAMPLE for Largest Percentage Increase**

- Fill in fields highlighted in light green. Fields highlighted in red are imported from the Template for Rate Disruption.

<table>
<thead>
<tr>
<th>Largest Percentage Increase</th>
<th>Corresponding Dollar Increase for Insured Receiving Largest Percentage Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncapped Change</td>
<td>30.0%</td>
</tr>
<tr>
<td>Capped Change (If Applicable)</td>
<td>15.0%</td>
</tr>
</tbody>
</table>

**Characteristics of Policy (Fill in Below)**

- For Auto Insurance: At minimum, identify the age and gender of each named insured, limits by coverage, territory, make / model of vehicle(s), prior accidents / violations history, and any other key attributes whose treatments are affected by this filing.

- For Home Insurance: At minimum, identify age and gender of each named insured, amount of insurance, territory, construction type, protection class, any prior loss history, and any other key attributes whose treatments are affected by this filing.

**Automobile policy: Three insured - Male (Age 36), Female (Age 48), and Male (Age 25). Territory: Las Vegas, ZIP Code 89105.**

<table>
<thead>
<tr>
<th>Vehicle:</th>
<th>DL Limits:</th>
<th>PD Limits:</th>
<th>UM/UM Limits:</th>
<th>MED Limits:</th>
<th>COMP Deductible:</th>
<th>COLL Deductible:</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009 Ford Focus</td>
<td>$50,000 / $100,000</td>
<td>$25,000</td>
<td>$50,000 / $100,000</td>
<td>$5,000</td>
<td>$500</td>
<td>$1,000</td>
</tr>
<tr>
<td>2003 Honda Accord</td>
<td>$25,000 / $50,000</td>
<td>$10,000</td>
<td>$25,000 / $50,000</td>
<td>$1,000</td>
<td>$500</td>
<td>$3,000</td>
</tr>
</tbody>
</table>

No prior accidents. 1 prior speeding conviction for 25-year-old male. Policy receives EFT discount and loyalty discount.

Primary impacts are the increases to the relativities for the age of insured, ZIP Code 89105, COLL Deductible of $1,000, and symbol for 2003 Honda Accord.

**Most Significant Impacts to This Policy**

- Identify attributes - e.g., base-rate change or changes to individual rating variables

**NOTE:** If capping is proposed to apply for this policy, include the impact of capping at the end, after displaying uncapped impacts by attribute. Add rows as needed. Total percent and dollar impacts should reconcile to the values presented above in this exhibit.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>% Impact (Uncapped)</th>
<th>Dollar Impact (Uncapped)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insured Age (M/25)</td>
<td>12.00%</td>
<td>$66.00</td>
</tr>
<tr>
<td>COLL Deductible ($1,000)</td>
<td>10.00%</td>
<td>$61.00</td>
</tr>
<tr>
<td>Territory (89105)</td>
<td>4.00%</td>
<td>$27.10</td>
</tr>
<tr>
<td>Vehicle Symbol (2003 Honda Accord)</td>
<td>1.40%</td>
<td>$10.29</td>
</tr>
<tr>
<td>Effect of Capping</td>
<td>-11.54%</td>
<td>-$52.50</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>15.00%</td>
<td><strong>$82.50</strong></td>
</tr>
</tbody>
</table>

**What lengths of policy terms does the insurer offer in this book of business?**

- Check all options that apply below.

- 12-Month Policies
- 6-Month Policies
- 3-Month Policies
- Other (SPECIFY)
**State Division of Insurance - EXAMPLE for Largest Dollar Increase**

* Fill in fields highlighted in light green.
* Corresponding Percentage Increase (for Insured Receiving Largest Dollar Increase)

<table>
<thead>
<tr>
<th>Largest Dollar Increase</th>
<th>Corresponding Percentage Increase (for Insured Receiving Largest Dollar Increase)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uncapped Change</td>
<td>Current Premium *306.60 Uncapped Percent Change 12.00%</td>
</tr>
<tr>
<td>Capped Change (If Applicable)</td>
<td>Proposed Premium *306.60 Capped % Change (If Applicable) 12.00%</td>
</tr>
</tbody>
</table>

**Characteristics of Policy** (Fill in Below)

- For Auto Insurance: At minimum, identify the age and gender of each named insured, limits by coverage, territory, make/model of vehicle(s), prior accident/violation history, and any other key attributes whose treatments are affected by this filing.
- For Home Insurance: At minimum, identify age and gender of each named insured, amount of insurance, territory, construction type, protection class, any prior loss history, and any other key attributes whose treatments are affected by this filing.

Automobile policy: Two Insureds - Male (Age 33), Female (Age 32). Territory: Reno, ZIP Code 89504.

- COMP Deductible: $2,500
- COLL Deductible: $2,500
- $2,500

1 prior at-fault accident for 32-year-old female. Policy receives EFT discount and loyalty discount.

Primary impacts are the increases to the relativities for the age of insured, symbol for 2015 Mercedes-Benz C-Class, and increased-limit factors for Property Damage and Medical Payments coverages.

**Most Significant Impacts to This Policy** (Identify attributes - e.g., base-rate change or changes to individual rating variables)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>% Impact (Uncapped)</th>
<th>Dollar Impact (Uncapped)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insured Age (M/33)</td>
<td>3.15%</td>
<td>$80.48</td>
</tr>
<tr>
<td>Insured Age (F/32)</td>
<td>3.23%</td>
<td>$85.13</td>
</tr>
<tr>
<td>Vehicle Symbol (2015 Mercedes-Benz C-Class)</td>
<td>2.48%</td>
<td>$66.65</td>
</tr>
<tr>
<td>Increased-Limit Factor for PD</td>
<td>1.55%</td>
<td>$43.20</td>
</tr>
<tr>
<td>Increased-Limit Factor for MED</td>
<td>1.10%</td>
<td>$31.14</td>
</tr>
<tr>
<td>TOTAL</td>
<td>12.00%</td>
<td>$306.60</td>
</tr>
</tbody>
</table>

**XV. APPENDIX D – INFORMATION NEEDED BY REGULATOR MAPPED INTO BEST PRACTICES**

TBD

**XVI. APPENDIX E – REFERENCES**

TBD

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Attachment Four

Consider a Response to the CAS/Discuss CAS/SOA Task Force’s Appointed Actuary Continuing Education Verification Process and Comments Received
Background

In 2018, CASTF accepted the qualified actuary continuing competence verification process proposal put forth by the CAS and SOA joint task force. This report from the CAS and SOA joint task force updates CASTF on the continued work of the CAS and SOA in developing procedures to implement the proposal.

We welcome CASTF’s thoughts, suggestions and guidance regarding the details outlined in this report. Our aim is to implement a process for recording continuing education (CE), and an annual NAIC report containing both qualitative and quantitative information, that will be useful to the NAIC in assessing CE for qualified actuaries.

CASTF’s related 2019 charge directs CASTF:

“identify 1) whether the P/C Appointed Actuaries' logs of continuing education (CE) should contain any particular categorization to assist regulatory review; 2) what types of learning P/C Appointed Actuaries are using to meet CE requirements for "Specific Qualification Standards" today; and 3) whether more specificity should be added to the P/C Appointed Actuaries' CE requirements to ensure CE is aligned with the educational needs for a P/C Appointed Actuary.”

Qualified Actuary CE Categorization

For Year 1, the CAS and SOA will review to the current 3.1.1.2 definition categories. Going forward we believe it is logical to refer to the 91 knowledge statements list that was methodically developed in 2018, per the NAIC’s oversight, for a P/C education program. The joint task force refined the list to apply to CE by removing subcategories that were suited specifically to basic education, and adding several additional categories that were appropriate to obtain through CE. Below is the resulting list of CE categories showing the joint task force’s: 1) removal of certain categories reflected by strike throughs; 2) addition of categories for CE (highlighted in yellow); and 3) thought processes (provided in CAPS).

1. Law/Regulation [NO SUBDOMAINS - SUBCATEGORIES LISTED FOR BASIC EDUCATION TOO DETAILED/NOT MEANINGFUL FOR CONTINUING EDUCATION – continuing education will most likely incorporate law/regulation INTO other topics or conversations on law/regulation in day to day work]
2. Policy form/coverage/underwriting/marketing (KEEP AS A SINGLE DOMAIN - WHEN TALKING ABOUT NEW/EVOLVING COVERAGES WILL COVER MANY OF THESE WITHIN A SINGLE SESSION)
   - Form/Coverage
   - Premium rates/Ratemaking (NEW)
   - Underwriting and/or marketing
     - Insurer Decisions including U/W or marketing (DUPLICATIVE with prior category)
3. Reinsurance
   - Reinsurance terminology (DELETE – basic education)
CAS/SOA Task Force: Appointed Actuary Continuing Education Verification Process
Implementation Report to CASTF – April 2019

- Statutory accounting
- Reinsurance collectability
- Reinsurance collateral and collectability (DUPLICATIVE with prior category – broadening)
- Reinsurance reserving

4. Reserves
- Reserving Data
- Data or Reserving Adjustments (DUPLICATIVE with prior category -broadening)
- Reserving Calculations
- Reserving Analysis
- Statutory accounting

5. Requirements & Practice Notes
- Annual Statement Instructions
  - Annual Statement Instructions and/or Academy or ASB (TOO REFINED)
  - Annual Statement Instructions and/or Academy or ASB (Significant, Material) (TOO REFINED)
- Academy or ASB (Materiality) (TOO REFINED)
- Academy or ASB (Users) (TOO REFINED)
- Academy or ASB (Outside of Area of Expertise) (TOO REFINED)
- Academy or ASB (Practice Note) (TOO REFINED)
- Practice Notes, ASOPs, etc. (Reworded to fit Continuing Education)
- Statutory Accounting
- Solvency Calculations
- Company-specific

6. Business skills (NONE)

OTHER CE that should be tracked (may be INSIDE or OUTSIDE the specific requirements of 3.1.1.2)
1. Risk management
2. Emerging Issues
3. Accounting other than Statutory accounting
4. Analytics
5. Modeling
6. Professionalism

The CAS and SOA will add a note to the qualified actuary CE collection form that it covers BOTH general (2.2) and specific continuing education standards (3.3) as a qualified actuary must meet BOTH of those requirements.
Review Scope & Procedures

For the yearly report to be presented to the NAIC, the CAS and SOA will review a portion of CE filers. Below is a rough sketch of the review process, with the details currently being developed:

Rough process:
- Summary spreadsheet will be sufficient documentation; if there are concerns the reviewers will contact the submitter.
- Spreadsheets will be reviewed to ensure they meet the “basics” – 30 hours, at least 6 organized, at least 3 professionalism, no more than 3 business skills, 15 hours in topics that meet the specific qualification requirement with at least 6 that are organized on a relevant topic
- Titles will be reviewed – if they are “clearly CE” – e.g. session sponsored by a “major” organization, employer sponsored with clearly recognized speakers, self-study on a recognized topic, e.g. “read new regulation on XYZ plus guidance from ABC accounting firm for 2 hours” then it would be deemed OK.
- Make sure for specific qualification standard – have 15 hours checked in one of the current 3.1.1.2 topics. Ensure title of sessions meets 3.1.1.2 topic checked.
- NOTIFY individuals they are being reviewed before the review starts (and give them an opportunity to submit additional information if they believe it would be helpful for the review)

For Year 1: The CAS and SOA would review to the current USQS 3.1.1.2 definition. Going forward, the review will be to the revised categories accepted by CASTF.

CASTF may consider requesting the American Academy of Actuaries update the topic list in 3.1.1.2 once the categories for CE are finalized.

Public reporting

The CAS and SOA would disclose in their respective public membership directories so that someone could look to see if a specific individual had attested to meeting the continuing education requirements for purposes of signing the annual statement.

The CAS and SOA will work on common language to be used by both organizations for both attestation and disclosure ... “e.g. meets the continuing education requirements of section 3.3. of the USQS for purposes of making an SAO in filing the NAIC P/C statement.”
NAIC Reporting & Analysis

The CAS and SOA will separately compile the data from our respective organizations for review. After anonymizing the data, the CAS and SOA will combine the information at the aggregate level for a joint report to the NAIC.

It is anticipated that the report content will contain both qualitative and quantitative information, including:

- Number of individuals who have attested compliance, number of filers reviewed and basics on the review (what we reviewed, how many passed, any concerns flagged, common pitfalls)
- Basic report on how people are earning their CE – illustrative. These are the topics we anticipate looking at:
  - By DOMAIN (e.g. 3.1.1.2 or the new topic list)
  - Organized vs. self-study
  - Employer vs. other providers. Actuarial organizations vs. other providers (? Accounting firms)
  - Of the 15 hours for the specific qualification standard – how many get more than 15, how much of this is organized (beyond the 6-hour minimum),
  - By event (e.g. major seminars/meetings)
- Recommendations – areas we would recommend addressed(changes in CE).

Requiring Qualified Actuary CE Attestation

The joint task force believes it is logical, and preferable, to include the requirement for a qualified actuary to attest to CE in the NAIC P/C Actuarial Opinion Instruction; inclusion in the instructions will make it clear that the attestation is a regulatory requirement. Accordingly, we respectively request CASTF consider revising the instruction to include the CE attestation requirement. Should there be insufficient time at the NAIC to process a revision to the instruction in 2019, insertion into the instruction’s guidance could be utilized until the instructions are modified to include the requirement.

Once CASTF has confirmed the process outlined in this report, the CAS and the SOA will work together to craft a joint communication regarding the new requirement for qualified actuaries to be disseminated to our respective members.
Background for Agenda Item #2:
Discuss the CAS/SOA Task Force’s
Appointed Actuary Continuing Education Verification Process

This document is from NAIC staff to provide some background on this “continued competence” work:

Last year before the Fall National Meeting, the CAS and SOA agreed to move forward jointly to address the continued competence charge. The agreed plan was as follows:

- Adopt annual attestation requirements by Dec. 31, 2019, for members who are property/casualty (P/C) appointed actuaries and who have met specific qualification standards (including the required CE requirements directly relevant to the topics identified as applicable to the NAIC P/C Statement of Actuarial Opinion).
- Publicly disclose the names of members who attest to meeting the CE requirements for P/C appointed actuaries.
- Annually audit a percentage of the membership who attest.
- Annually submit a report to the NAIC regarding how the CE requirements were generally met and how the P/C appointed actuaries audited generally performed in the audit.
- Conduct ongoing work with the NAIC to identify whether the CE logs should contain any particular categorization; what types of learning actuaries are using to meet CE requirements today; and whether more specificity should be added to the CE requirements for P/C appointed Actuaries.

Aug. 8, 2018 minutes: Mr. Dyke said the joint group discussed what is being measured by continued competence and whether CE is an effective measure. The use of CE to measure continuing competence is an acceptable approach to meet international standards, according to the NAIC’s consultant. The ability to attest mid-year, details of the summary and loss form, and the ability to accept attestations from non-members could be implemented. He said the work of the joint task force is completed. He said the group is ready to move to implementation. He said the charge would not be needed for 2019, but he suggested the charge be replaced with the plans for implementation.

2019 CASTF Charge: “identify 1) whether the P/C Appointed Actuaries’ logs of continuing education (CE) should contain any particular categorization to assist regulatory review; 2) what types of learning P/C Appointed Actuaries are using to meet CE requirements for "Specific Qualification Standards" today; and 3) whether more specificity should be added to the P/C Appointed Actuaries’ CE requirements to ensure CE is aligned with the educational needs for a P/C Appointed Actuary.”

Kris DeFrain
Dear Kris,

Thank you for the opportunity to provide a comment. I appreciate the work of the CAS/SOA task force.

I understand that the CAS and SOA will consider appointed actuaries’ continuing education (CE) in light of certain categories (law/regulation, reinsurance, etc.). Gathering data on the categorization of CE may be useful and could prompt discussion. I might be concerned, however, if the data gathering exercise leads to a recommendation to implement requirements on the number of hours attained in each category (e.g., minimum of 2 credit hours in law/regulation, minimum of 2 credit hours in reinsurance, etc.). It could be problematic to add more specificity to the CE requirements because an appointed actuary should tailor his CE to his particular situation. CE should bridge any gaps between what the actuary needs to know to sign the opinion and what he currently knows via basic education, experience, and past CE. The breakdown of CE by category could look very different for two appointed actuaries who have different backgrounds and work on different types of engagements.

Sincerely,

Julie Lederer

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From: DeFrain, Kris <kdefrain@naic.org>
Sent: Tuesday, May 14, 2019 4:47 PM
To: DeFrain, Kris <kdefrain@naic.org>
Subject: CASTF Exposure of CAS/SOA Continued Competence Proposal

To the Casualty Actuarial and Statistical (C) Task Force Commissioners’ Representatives, Interested Regulators and Interested Parties:

On its call today, the Casualty Actuarial and Statistical (C) Task Force exposed the CAS/SOA Task Force’s Appointed Actuary Continuing Education Verification Process proposal:
https://naic.org/documents/cmte_c_catf_190514_review.docx

The proposal is exposed for a 24-day comment period, with comments to be submitted to Kris DeFrain (NAIC) by Friday, June 7. The Task Force specifically requested attention to the categorization of continuing education included in the proposal.

The short comment period was established so the Task Force can discuss comments on its June 11 conference call. For additional information on this project see the following background document:
(https://naic.org/documents/cmte_c_catf_190514_review_background.docx)

Kris DeFrain, FCAS, MAAA, CPCU
Director, Research and Actuarial
NAIC Central Office
(816) 783-8229

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Comments on the May 14, 2019, Exposure Draft of the CAS/SOA Continued-Competence Proposal

Gennady Stolyarov II, FSA, ACAS, MAAA, CPCU, ARe, ARC, API, AIS, AIE, AIAF
Lead Actuary, Property and Casualty Insurance
Property and Casualty Section, Nevada Division of Insurance

Kris DeFrain, FCAS, MAAA, CPCU
Director, Research and Actuarial Services
National Association of Insurance Commissioners (NAIC)

Sent via e-mail at kdefrain@naic.org

June 7, 2019

Dear Ms. DeFrain:

Thank you for the opportunity to comment on the May 14, 2019, exposure draft of the Continued-Competence Proposal created by the Casualty Actuarial Society (CAS) and Society of Actuaries (SOA).

While I am supportive of the general intentions of the proposed framework, I recommend a clarifying change within it.

Key Principle: The new Continued-Competence Framework should only be mandatory for actuaries seeking to satisfy the Specific Qualification Standards to become Property and Casualty (P&C) Appointed Actuaries. It should not be mandatory for those actuaries seeking to satisfy the General Qualification Standards only. For satisfying the General Qualification Standards only, the historic manner of tracking continuing education should remain recognized as sufficient.

I am of the view that the above needs to be clarified explicitly, as the exposure draft currently includes a statement at the bottom of page 2 that “The CAS and SOA will add a note to the qualified actuary CE collection form that it covers BOTH general (2.2) and specific continuing education standards (3.3) as a qualified actuary must meet BOTH of those requirements.” While the P&C Appointed Actuary would indeed be required to satisfy the General Qualification Standards pertaining to continuing education, in addition to the Specific Qualification Standards (and this is my interpretation of the intent of the above-quoted wording), it would be desirable to add a clarification to the following effect: “An actuary seeking to satisfy only the general continuing-education standards (2.2) is not required to complete the CE collection form and instead may continue to track CE in any other manner that would appropriately document the satisfaction of the general continuing-education standards.”

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Ultimately, the entire scope of the CASTF’s charges, of which the charge to develop a continued-competence framework is one, pertains solely to the realm of P&C Appointed Actuaries who sign statutory Statements of Actuarial Opinion for P&C Annual Statement purposes. It is, accordingly, important that any Continued-Competence Proposal also remain within the scope of the aforementioned charge and not be expanded to encompass the majority of P&C actuaries who are not, and who likely do not aspire to be, P&C Appointed Actuaries. For those individuals, a wide variety of means to document their continuing education should remain available, as long as those individuals are able to demonstrate upon request by the CAS or SOA that they satisfy the General Qualification Standards pertaining to continuing education. Of course, I would have no objection to other actuaries voluntarily electing to utilize the CE collection form, even if they have no intention of becoming P&C Appointed Actuaries – but this should always remain an optional prerogative for such individuals.

Sincerely,

Gennady Stolyarov II, FSA, ACAS, MAAA, CPCU, AR, ARC, API, AIS, AIE, AIAF
Lead Actuary, Property and Casualty Insurance, Nevada Division of Insurance
Comments on CAS/SOA Continued Competence Proposal

Submitted June 6, 2019 via email

Kris DeFrain,

Thank you for this opportunity to submit comments related to the proposed CAS/SOA Continued Competence Proposal that was exposed for comment on May 14, 2019. Please note that these comments are my own and do not represent comments of my employer or of any professional association.

In my comments, I have several areas where the implementation plan described in the proposal is unclear. I recognize that this particular document was not intended to be the instructions or communication that goes out to opining actuaries related to this topic. As a result some of my comments may relate to information that will be included in such communication.

The document provides a listing on pages 1 and 2 of categories of learning topics. I am interpreting this listing in plain language to be topic areas covered in Continuing Education offerings.

- The document then describes the audit process and indicates that the CAS and SOA will compare the audited CE logs of selected actuaries in Year 2 to the listing on pages 1 and 2 of the document. Is the intent here that a best practice for opinion writers is to keep a CE log with an indicator of the CE by the items listed on pages 1 and 2 of this document? Or is it expected that the auditor will do that classification?
- This is important outside of the CAS/SOA auditing process as the same log is likely to be prepared by the actuary as part of the documentation within the actuarial report that documents the actuary’s qualifications.

The task force requested comments on the particular categories. The following are my specific comments about the categories.

- Actual continuing education offerings do not fall nicely into the series of categories that are listed here or that could be listed here. In practice, judgment will be used to map actual continuing education into any set of categories.
- A practicing actuary is not likely to have the continuing education taken in any given one year period cover all of these categories. My concern is that someone in the process will decide that all categories need to covered annually, which then becomes a larger continuing education burden on the actuary.

Lisa Slotznick, MAAA, FCAS

lisa.slotznick@pwc.com
Attachment Five

Society of Actuaries (SOA) General Insurance Actuarial Research and Education Update
Casualty Actuarial and Statistical (C) Task Force
2019 Summer National Meeting
New York
Saturday, August 03, 2019
9:30 AM - 11:30 AM ET
Mercury Ballroom - 3rd Level

Society of Actuaries (SOA) Actuarial Research and Education Update

- Highlights of Recent Research Reports
  - April, May, June 2019: *Actuarial Weather Extremes*
    - [https://www.soa.org/resources/research-reports/2019/weather-extremes/](https://www.soa.org/resources/research-reports/2019/weather-extremes/)
  - Monthly report that identifies and examines unusual or extreme single-day or multi-day weather events across North America
  - Data sources include:
    - National Oceanic and Atmospheric Administration’s (NOAA) National Centers for Environmental Information’s (NCEI) Global Historical Climate Network (GHCN)
    - United States Geological Survey (USGS)
    - United States Department of Agriculture (USDA)
  - April 2019: “Bomb Cyclone” temperature swings; Extreme precipitation
  - May 2019: Heat; Tornadoes; Flood
  - June 2019: Heat; Derecho; Flood; Impact on Crop Planting
  - July 2019: Hurricane Barry; Flood; Heat

- Education update on Predictive Analytics modules and examinations
A derecho is a large, straight-line wind storm that is associated with a fast-moving group of severe thunderstorms.

Each dot represents a high-speed wind event recorded by NOAA’s Storm Prediction Center on June 21.

The colors indicate the number of hours elapsed since the Derecho’s inception:

- Yellow = 0 to 6 hours
- Orange = 6 to 12 hours
- Red = 12 to 18 hours
- Blue = 18 to 24 hours
Stream Gauges in Flood Status in June 2019

The USGS stream gauge locations are color-coded to indicate the total number of days of flooding in June 2019, as follows:

- Yellow = 1 to 7 days
- Red = 8 to 15 days
- Blue = 16 to 23 days
- Black = 24 to 30 days

USGS = United States Geological Survey

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