Pricing the Hybrid

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Abstract

The current literature describes pricing and reserving of medical malpractice insurance as written on either an occurrence or a claims-made basis. In current practice, many policies allow the reporting of incidents before a claim is submitted, to attach the claim to the current claims-made policy. This creates experience with characteristics of both types of experience. This paper addresses the blend of the two types of experience based on the acceleration of the attachment of claims from their true assertion date back into the claims-made period. The goal is to assign exposure in proportion to expected claims, and to determine the number of claims and the related reserves to expect to be assigned to the current claims-made policy and to the residual tail exposure, and to reflect the change in the final pricing of the policy.

Keywords. Medical malpractice, claims-made, pricing, reserving, Monte Carlo modeling

1. Introduction

Insurance contracts have been bound to provide coverage for events that occurred during the contract period since the inception of insurance. In the ninety years since its inception, the Casualty Actuarial Society has published papers outlining problems and methods to address these concerns in analyzing property/casualty experience for reserving and pricing.

The problems of estimating professional liability costs in the late 1970's led to the emphasis of providing insurance on a "claims-made" coverage basis. The claims-made coverage facilitated the analysis by concentrating on reserving and pricing the events that would be newly reported and deferred the more difficult effort to evaluate future reported claims. The claims-made policy continues to be used extensively for professional liability, and has been adopted for use on other difficult lines such as Directors and Officers Liability.

The occurrence policy attaches responsibility for the claim to the policy in effect when the event giving rise to the claim took place. While this definition seems precise, there has been substantial controversy and litigation over identifying a precise moment of occurrence, especially when a continuous event is taking place. It is not the purpose of this paper to investigate making this assignment, but to recognize that once this definition is accepted, the claim is attached to the occurrence policy in effect on the occurrence date even though it may be reported a substantial amount of time after the occurrence date. Once the claim is reported, a determination is made and the count of the claim and the costs for the claim are

assigned back to the "occurrence" period. Tracking the history of the reporting and change in cost estimates provides historical development patterns. For simplicity, assume that these periods are 12-month continuous periods that will be called years.

The assignment of a claim and its associated costs back to the occurrence year means that there will be future changes to be anticipated in the number of claims reported, the costs of the new claims and any revisions in the estimate of the costs on claims previously reported. The estimate of the costs on future reported claims is the "pure" portion of what is normally referred to as IBNR (Incurred But Not Reported).

Under the claims-made policy, the assignment of a claim to the insuring policy is simplified. When the insurer receives notice of a claim, either directly or through its agent (either the insurance agent or the insured acting as a conduit to the insurer), the claim attaches to the policy in effect on that date. While there may be a short delay from the acceptance of the notice until the matter is recorded by the insurer, the "pure" IBNR is zero as all claims are known by the end of the policy term. There will not be any increases in claim counts except for the occasional clerical lag or mishandling. Any development of the case incurred losses will be from adjustments made on known claims, and the general "IBNR" fund for these changes is only for this more limited need. The claims-made insured will have some lingering exposure that will attach subsequent to the expiration of the current policy, and this is referred to as the "tail" of the experience.

Some claims-made policies provide for a claim to be attached to a current policy if the insured gives the insurer notice that an incident has occurred that may result in a claim being asserted in the future. The "assertion" of the claim is the official submission of a request for damages from the claimant to the insured/insurer. The traditional "report date" corresponds to the "assertion date" referred to in this paper. To distinguish from the pure IBNR claims, these reported but not asserted claims will be called "RBNA", and the remaining unknown claims will be the incurred but not known, "IBNK".

Marker and Mohl initially state as Principle #4[1], "Claims-made policies incur no liability for IBNR claims …" and later state[2] that at the introduction of the claims-made policy, it was "assumed that, on average, claims would be reported sooner" and "that there would be

[1] Joseph Marker and James Mohl, "Rating Claims-Made Insurance Policies", CAS 1980 Discussion Paper Program, page 278.
[2] Joseph O. Marker and F. James Mohl, ibid, page 293.

some additional reporting of incidents that would never have come in under the occurrence policy". This acceleration was viewed as a one-time occurrence at the transition. Their on-going approach did not identify the RBNA component within the claims-made year, and treated its emergence in their backward-recursive development factors. However, an on-going acceleration of claim reporting may adversely affect the adequacy of the renewal premium.

There are pros and cons as to why an insured may give the insurer notice of a potential claim beyond simply providing the insurer additional time to prepare the insurer's defense of the potential claim. If the insured believes that this claim and the aggregate of the other expected claims for this period are within the limits currently purchased, then it is to the insured's benefit to submit an incident report to the insurer during the current policy period. This will maximize the benefit of the coverage already purchased and reduce the future liability under either another claims-made policy, or a "tail" coverage policy. If the insured is switching to self-insurance without purchasing a tail policy, then the reporting of incidences can only reduce potential self-insurance costs. A tort reform change may also simulate a change in the reporting and assertion pattern.

If the frequency of claims or magnitude of a particular claim would exceed current coverage, then there is a disincentive to report the incident until an actual assertion of a claim is received. There is also an incentive for the insured to purchase increased coverage in future policies when there is an increased likelihood of a need for such expanded coverage. When the renewal policy is for limits greater than the expiring limits, an endorsement could be attached that applies the expiring limits to claims reported subsequent to the occurrence year. If the underwriter is really concerned about this possibility, the new policy will not be permitted to have the limit changed.

2. Analysis of the Hybrid

It is the reporting of the incident prior to the claim's assertion that creates a hybrid between the claims-made and occurrence policy. The maximum number of potential claims will be known at the end of the policy, but the number of asserted claims will emerge over time and, therefore, have some characteristics similar to an occurrence policy. Not all potential claims that occur during the policy period will be recognized and reported as an incident within the policy period. The future asserted claims that were not reported as an

incident in the first policy period (incurred but not known or IBNK) will attach to a future claims-made policy. The claim count on a hybrid policy will be a blend of:

- Claims that occurred during this period and are asserted during this period.
- Claims asserted during this period that were IBNK at the end of the prior period
- Claims that occurred during this period that are reported but not asserted (RBNA).
- Claims reported during this period that were IBNK at the end of the prior period, but that are not asserted yet (RBNA).

The reserve needed for this period consists of a provision for adjustments on case reserves on asserted claims (the first two types) plus a provision for RBNA claims as of the evaluation date (the last two types). The residual IBNK reserve is a separate issue to be handled as "tail" coverage or in a subsequent claims-made policy

For analysis purposes, some companies may set a subjective reserve and probability of assertion on individual incident reports if there is a substantial likelihood of a future claim with a payment. The hybrid therefore has reserves for development on known case reserves plus reserves on claims reported as incidents but not asserted (RBNA). The subjective reserves are part of the RBNA. They generally are not carried on the books as official reserves, but are used only in the reserve analysis for estimating case incurred development, claim frequency, and claim severity distributions.

In a perfect world, all risks would have experience available and be sufficiently large to be given full credence. If complete information were available, development triangles unique for this business could be calculated and applied. Lacking this, an estimate of the impact using a broad based distribution, and information and assumptions about the particular segment of business are used. This paper assumes complete information is not available and presents an approach to estimate the RBNA reserve. This approach is particularly useful when the pure IBNR is to be modeled using a Monte Carlo simulation.

The method requires knowledge of the claim reporting distribution between the occurrence date and the assertion date. If this distribution is defined in terms of the number of days between these dates, then an assumption should be made, such as "claims occur uniformly throughout the year", and the distribution converted into the portion reported by the end of 12 months, 24 months, etc. Edward Weissner's paper[3], "Estimation of the Distribution of Report Lags by the Method of Maximum Likelihood", describes a procedure for estimating the distribution when the final claim reporting is still unknown. For this paper's purpose, Exhibit 1 creates a claims-made reporting pattern using an estimated[4] probability distribution of the number of months between the occurrence and the assertion of a claim. Column (a) is the age, in months, from an occurrence that will produce a claim until the time of its assertion. Column (b) is the probability that the claim will be asserted in that month. Column (c) is the sum of the probabilities that the claim has been asserted by the end of the indicated month. Claims are assumed to occur uniformly throughout the year. An occurrence year would have an equal expected number of claims from each month but with varying ages of maturity. Column (d) calculates the 12-month rolling average of the monthly data by summing Column (c) for the 12 months ending at this age, and divides by 12. Note that if the occurrence year is a partial year (less than 12 months old), the rolling average needs to be adjusted for the period incurred.

Knowledge of the acceleration due to the incident reporting needs to be quantified when analyzing the hybrid. A development triangle of asserted claims by claims-made year can be compared to the distribution described in the previous paragraph. The claims-made distribution by report date defines how claims are assigned to current and future report years, and once assigned there is no development of claim counts. The measured development from the claims-made triangle is all emergence on claims reported as incidents by 12 months. At one extreme, if there is no incident reporting until a claim is asserted, the acceleration is 0% and the reporting distribution is a standard claims-made reporting pattern. At the other extreme, if incident reports are made on every situation inclusive of all claims ultimately asserted, then the acceleration is 100% and the resulting distribution is the same as the reporting pattern for an occurrence policy. Exhibit 2 is a table of the cumulative number of claims asserted for each evaluation of the hybrid year where the claim attaches.

[3] Edward W. Weissner, "Estimation of Distribution of Report Lags by the Method of Maximum Likelihood", PCAS LXV, page 1.
[4] The distributions used in this paper have been created to produce realistic results similar to observed data.

Acceleration could also be measured based on the additional change measured on developing losses. Quantifying the additional development resulting from late asserted claims over the case development on claims asserted within the first year, may be difficult to identify and measure. The probability of a severe claim having a higher likelihood of being reported early or late is debatable. Operating on the wrong part of the body or excessive anesthetics can be severe and immediately known damage. Missing a diagnosis, or leaving a foreign object in the body, may take years to recognize and cause irreparable harm or extended pain and suffering. Several large insurers now reflect different reporting patterns by specialty. It has been assumed in this paper that the severity of the claim is independent of the length of time for the claim to be asserted. Therefore, measuring the change in reporting patterns tracks with the associated costs. An adjustment for payment patterns is addresses later in the paper.

If the claim development shows that the number of claims reported at 12 months will ultimately increase by 48%, as in the example on Exhibit 2, then the quantity of 48% times the percentage of claims asserted at 12 months, divided by the percentage unreported at 12 months, gives a measure of the accelerated claim reporting. This calculation can be made at each successive12-month evaluation to determine the accelerated portion reported by that date. It is not obvious that an insured will be better at identifying and reporting an incident that will be asserted in the third year verses being asserted in the fifth year. It may be possible to report incidents occurring near the end of the policy period that are more likely to be asserted in the next 12 months. A uniform acceleration has been used in this paper, and is reflected in Exhibit 3.

A second possible measure of the acceleration can be estimated based on the frequency of the incident reports compared to a standard reporting frequency. If the underlying claim frequency is expected to be the same, then the ratio of incident frequency to asserted frequency is a measure of the acceleration. An adjustment may need to be applied to reflect a probability of less than 100% that all the incidents reported will result in an asserted claim. The initial incident reports should have a much higher probability of predicting an assertion. As the number of incident reports increase, the probability of identifying a future assertion should stay the same or decrease as marginal incidents are added. It is unlikely that an insured will be able to report all incidents that will result in an asserted claim without reporting an excessive number of incidents that will not result in an asserted claim. The example of neglecting to remove a foreign object from the body after an operation, will either be immediately known and treated, or remain unknown until such time that it is

discovered and an immediate claim assertion is made. There is little expectation that an occurrence has taken place between those times that would warrant an incident report.

The hybrid year claim distribution, resulting from applying the acceleration, is separated into attachment years (hybrid year) on Exhibit 3. The change in the cumulative assertions (Exhibit 3, line (c)) is the amount of assertions during the calendar year as represented by each column. The probability that an RBNA will be asserted during the current calendar year is the ratio of asserted claims to the RBNA at the end of the prior year.

The cumulative development factor from Exhibit 2 provides a measure of the acceleration as a ratio of the projected the future assertions 0.09093 [=(0.18917)(0.481)] to the unasserted claims at the end of the first year 0.81083. The ratio indicates 11.214% of what would be claims in future claims-made years will now be attached to the current hybrid year. Assuming that the acceleration is uniform, the cumulative portion of occurrence claims attached is the sum of the claims asserted to date plus the acceleration ratio times the portion of claims not asserted as of the evaluation. The calendar year change in the cumulative total is the hybrid year's ultimate portion.

On Exhibit 4, the portion of the occurrence year accelerated and attached within the hybrid year is split into the amount asserted at each subsequent evaluation date, and the portion remaining as RBNA. These are expressed as proportions of the original occurrence-based incurred. Exhibit 4 assigns the ultimate hybrid year total [Exhibit 3, row (i)] to the initial subtotal for the hybrid year on Exhibit 4. The assertions during the calendar year [Exhibit 3 row (c)] correspond to the Total New Assertions at the bottom of Exhibit 4. The assertions during the calendar year are distributed between active hybrid years in proportion to the RBNA existing at the beginning of each the calendar year. Subtracting the asserted claims from the beginning RBNA produces the RBNA at the end of the current calendar year that will also be the RBNA at the beginning of the next calendar year. The probability that a RBNA will be asserted is the ratio of the assertions during the year to the RBNA at the beginning of the year.

Exhibits 4a and 4b provide the same information as Exhibit 4 but Exhibit 4a has 0% acceleration and, therefore, resembles a pure claims-made policy, and Exhibit 4b assumes 100% acceleration and, therefore, resembles an occurrence policy. As the acceleration increases, the tail diminishes as the exposure is shifted back into the prior years.

A multi-year analysis is modeled on Exhibit 5a and 5b. If the insureds are large self-insured hospitals or physician groups written on a claims-made policy. They want to know three things:

1. What is the reserve need at the end of the policy period?
2. What funding is needed for the next year?
3. What residual liability exists beyond next year?

The development on asserted claims can be measured using the standard actuarial techniques; however, care must be used not to include the pure IBNR emergence that is calculated separately. The cost of the unasserted and future claims is essentially a frequency time severity projection: multiplying frequency estimates times the underlying exposure, and multiplying the resulting expected number of asserted claims times an average claim cost amount.

A full-time equivalent exposure (FTE) is calculated as the sum of the product of the unit exposure and the rating relativities; such items as classification, territory, step factor[5], and fractional year exposed. These relativities recognize the variation in costs by medical specialty (classification), tendency for more or larger settlements depending on the location within the state (territory), number of years written under a claims-made policy (step factor), and portion of a year insured (fractional year). The historical claims are adjusted to a closed with payment basis, and developed to an ultimate occurrence basis for use in determining the underlying claim frequency. The historic claim frequency is used to project the ultimate frequency for each period under review. The product of the ultimate frequency and FTE produces the expected number of ultimate claims for each period.

On Exhibit 5a, the hybrid year proportions [Exhibit 3, row (i)] are multiplied times the calendar year exposures to distribute the exposures over the years in proportion to the expected claim assertions. The column can be summed to obtain the hybrid year total. A simplifying assumption could be made that either no exposure growth exists or that a fixed percentage of growth applies over all years. With these assumptions a modified distribution can be derived and applied to only the current calendar year exposure. This has not been done here. The proposed procedure has the benefits of: being sensitive to uneven growth that may arise from such things as general expansion of business or acquisitions; provides

[5] The step factor represents the cumulative percentage of an occurrence year that has been insured.

details of where the expected asserted claims were incurred; and facilitates applying trends and/or discounts related to the time lags. Exhibit 5a displays the allocation of the total exposures in proportion to the expected claim attachment distribution. Exhibit 5b multiplies the exposures times a frequency to project the expected ultimate claims for the occurrence year, and then uses the hybrid year proportions to distribute claims to the hybrid year.

The ultimate claims underlying the three desired quantities are found on Exhibit 5b. The ultimate claims for Hybrid Year 0 and prior are the asserted and RBNAs as of the experience evaluation date (claims in columns (r) thru (w)). The claims enclosed in the box produce the tail exposure at the Year0 year end evaluation. The claims under Year+1 (135 claims) will produce the loss experience to be funded for the next year, and the new tail subsequent to next year (160 claims) will be the losses produced by the claims in Columns (y) through (ad).

The separation of the asserted and the RBNA claims for Year 0 and prior is calculated on Exhibit 6. The ultimate claims on the upper portion of Exhibit 6 were calculated on Exhibit 5b. For each occurrence year, a line is shown with its contribution to the hybrid years in each column. The RBNA is the product of the ultimate occurrence year claims times the RBNA ratio for that assertion year and evaluation lag. The 12 RBNAs for Year0 is the product of 136 ultimate claims [column (b)] time 0.09093 on Exhibit 4 for Year0.

If a change in the acceleration has or is expected to take place, a probability of assertion can be calculated for each hybrid year and evaluation lag. The probability of assertion would be multiplied times the RBNA to determine the number of new asserted claims, and the remaining RBNA count. The probability of assertion may also be adjusted to reflect impacts of tort reform legislation. The cumulative emerged claims equals the ultimate minus the ending RBNAs. The hybrid year count is the total of the column.

The case incurred on known claims can be projected to ultimate using loss development factors if sufficient historical experience is available. However, including the open counts with the RBNA counts provides a mechanism to determine a range around the ultimate losses. Only the claims where a high likelihood that the case incurred is correct are treated as equivalent to a closed claim. The projected RBNA reserve is added to the "closed incurred" to determine the ultimate incurred.

The approached used to project the RBNA reserve is a Monte Carlo model similar to that described by Bickerstaff[6]. The loss dollars on closed claims and the subjective estimates for RBNAs with a high likelihood of payment, are trended to a common date, and fit with distribution curve(s), usually a single or compound log-normal curve(s) to project unlimited losses. A set of simulations (usually 1,000) are run to project first the number of claims based on a claim count distribution (a Poisson distribution is often used) with the expected number of claims as the mean. And second, for each random claim drawn by the Poisson, a random claim size is generated using the mean and variance of the severity-modeled lognormals. The lag between the time the incident is reported to the closing date can be accounted for by trending the (unlimited) severity mean used to generate the claim size.

A loss expense adjustment cost is also generated for each claim. On average, the loss expense increases as the size of the loss increases. Bickerstaff[7] demonstrated the development of a conditional Defense and Cost Containment (DCC) distribution. Its parameters and the generated loss size are used to generate a random DCC for the unlimited loss-size claim. After generating the DCC, the claim-size is limited to the policy provisions. If the policy terms include DCC within the coverage limit, then the combination of loss and DCC is limited and prorated.

The losses and DCC are summed for each sample, and the samples used to calculate the expected value, and the funding needed to meet the desired probability levels of confidence of adequate reserves. An additional loading is added for the reported incidents that are expected to produce loss adjustment expenses, but no indemnity payments.

One factor to consider for the hybrid is whether the paid development will be the same for claims reported and asserted in the first year, compared to claims asserted in future years. One large insurer has developed statistics that show the payout on claims asserted after the occurrence year is longer from occurrence than for claims asserted in the occurrence year, but when comparing the development from the year asserted, the payout is faster on the claims asserted after the year in which the event occurred giving rise to the claim. The speed up is faster during the first year after the assertion, and the differences diminish with age. This introduces a new dimension into determining the discounted value of the reserves.

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[6] Dave Bickerstaff, "Hospital Self-Insurance Funding: A Monte Carlo Approach", CAS Forum, Spring 1989 Edition, page 89.

[7] Dave Bickerstaff, "Hospital Self-Insurance Funding: A Monte Carlo Approach", CAS Forum, Spring, 1989 Edition, page 105.

The statewide rate level change is based on comparing the indicated average premium to the current on-level average premium. Medical Malpractice policies generally carry high limits. It is a common practice to limit the analysis (premiums and losses) to a selected lower limit, such as 200/600 or 500/1000, to reduce the parameter variability. The fixed expenses are included in the premium as an Expense Constant added to the variable portion of the premium. The variable portion is the product of a "base rate" multiplied by relativity factors to adjust for territory, classification, time insured by claims-made coverage, and the other credit and debit adjustments. For the remainder of the paper I will use the more common term "claims-made" as inclusive of the "hybrid" coverage unless stated.

The current base rate is a know quantity. The average current relativity is calculated by sequentially applying the current relativity and measuring the average factor resulting from the application of a rating element. Exhibit 7 shows the determination of the average relativity as each rating element is added. The sequential calculation also facilitates measuring changes in relativities; however, none are taking place in this review. The product of the exposure, based on head-count, times the sum of the expense constant plus the base rate times the average factors (Exhibit 8) develops the premium at current rates.

The incurred losses and DCC expenses need to be increased for the Adjusting and Other expenses (AO, formerly known as unallocated loss adjustment expenses (ULAE)). Countrywide experience from the Annual Statement's Schedule P provides incurred Loss, DCC and AO experience. Ratios of the AO to loss plus DCC are calculated (see Exhibit 9) for the last 5 years. A loading is selected and applied to the state loss plus DCC to determine the ultimate incurred for all loss and loss adjustment expense.

The incurred loss and loss adjustment expense needs to be adjusted to the level expected under the new rates. A pure premium per base class equivalent exposure is calculated on Exhibit 10. Curves are fit by least squares to the average pure premiums for several lengths of time, and the best fit for each time span is shown. An annual trend amount is selected and used to project the historic loss and loss adjustment expense to the mid-point proposed under the new rates.

The expense loadings are separated between variable costs and fixed costs. The General Expenses and Other Acquisition are allocated on a per exposure insured basis to recognize that the costs to write and issue a policy do not materially vary with the location or classification of the risk. For this allocation the actual exposure are divided into the dollars

of fixed expenses. The variable expenses are typically dependent on the state where the premium will be charged. The taxes, licenses and fees are dependent on the state laws. The brokerage and commissions are dependent on the contracts that will apply under the new rates. The adjustment for investment income recognizes the investment income on the available funds generated by the cash-flow and prevailing rates of return and taxes.

There are many papers on investment income calculations. This paper will not delve into a particular method, but it should be noted that with the shortened life of a claim under a claims-made policy, the investment income is significantly less than that realized under an occurrence policy. The hybrid policy will realize a return between the occurrence and pure claims-made amounts based on its payout pattern.

The premium from the expense constant will be subject to taxes, commissions, etc. The fixed expenses are loaded for these elements by dividing by the variable expense factor. The premium for fixed expenses is divided by the number of exposures that will be assessed the expense constant. One expense constant will be charged for every exposure, and will only be modified for a shortened policy term.

The statewide rate level indication uses premiums and losses limited to $500,000 per claim/$1,000,000 aggregate basic limit. These losses and loss adjustment expenses are trended to the average loss date under the proposed rates, and divided by the base class equivalent exposures to determine the indicated base pure premium at the future rate level. A base pure premium is selected, and a percentage, say 5%, is added for Death, Disability and Retirement[8]. The result is divided by the variable expense factor to determine the indicated base rate. The indicated average premium is the product of the base rate, the average proposed base class factor (which includes all factors other than the increased limit factor), and the average increased limit factor, and, as the final step, the expense constant is added. Dividing the indicated average premium by the current level average premium produces the indicated change.

This paper does not include revisions being made to the rate relativities, but the off-balance from each is used to adjust the base rate, and maintain the selected overall average premium.

[8] The Death, Disability and Retirement provision is a loading in an on-going business to provide for the average cost of tail coverage on individuals who have ceased to practice through death, disability or retirement.

3. Conclusion

A critical factor in evaluating medical malpractice insurance is to determine the period where claims will attach, and to align the losses and exposures. The claims-made policy provision allowing an insured to report an incident of a potential claim, and thereby attach that claim to a particular policy, creates experience that is a hybrid between a claims-made policy and an occurrence policy. The more aggressively the insured reports incidents in advance of the actual assertion of the claim, the greater the experience will resemble the experience expected under an occurrence policy. The procedure described in this paper facilitates measuring the shift and the calculation of the pure IBNR created for the claims-made policy by the acceleration of the attachment of the claims.

The shift in claims covered from a pure claims-made coverage, increases the pure premium needed, increases the step factors that apply, and increases the investment income. The amount of acceleration allowed determines the degree that the change moves from a pure claims-made basis to an occurrence basis.

4. References

Bickerstaff, Dave, "Hospital Self-Insurance Funding: A Monte Carlo Approach", CAS Forum. Spring 1989 Edition, 89-138.
Marker, Joseph, and James Mohl, "Rating Claims-Made Insurance Policies", CAS 1980 Discussion Paper Program, 265-304.
Weisnner, Edward W., "Estimation of Distribution of Report Lags by the Method of Maximum Likelihood", PCAS LXV, 1-9.

Abbreviations and notations

AO, all other loss adjustment expense
DCC, Defense & Cost Containment expense
FTE, full-time equivalent exposure
IBNK, incurred but not known
IBNR, incurred but not reported
RBNA, reported but not asserted
ULAE, unallocated loss adjustment expense

Biography of the Author

R. Stephen Pulis, ACAS, MAAA, is a consulting actuary at Actuarial Services and Programs in Houston, Texas. He has a Bachelor of Science Degree in Mathematics from Michigan State University. He is a past president of SWAF, and has participated on industry committees, and CAS research.

Exhibit 1

Development of Claim Reporting Distribution

(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)
	Single Claim - Month		Year-to-Date		Single Claim - Month		Year-to-Date
Month	Prob Rpt	Cum Rpt	Cum Rpt	Month	Prob Rpt	Cum Rpt	Cum Rpt
1	0.000	0.000	0.00000	37	0.006	0.939	0.81650
2	0.010	0.010	0.00083	38	0.006	0.945	0.74650
3	0.020	0.030	0.00333	39	0.006	0.951	0.67525
4	0.030	0.060	0.00833	40	0.005	0.956	0.60317
5	0.040	0.100	0.01667	41	0.005	0.961	0.53025
6	0.050	0.150	0.02917	42	0.005	0.966	0.45650
7	0.050	0.200	0.04583	43	0.004	0.970	0.38208
8	0.050	0.250	0.06667	44	0.004	0.974	0.30700
9	0.050	0.300	0.09167	45	0.004	0.978	0.23125
10	0.045	0.345	0.12042	46	0.003	0.981	0.15483
11	0.045	0.390	0.15292	47	0.003	0.984	0.07775
12	0.045	0.435	0.18917	48	0.003	0.987	0.96600
13	0.040	0.475	0.22875	49	0.002	0.989	0.97017
14	0.040	0.515	0.27083	50	0.002	0.991	0.97400
15	0.040	0.555	0.31458	51	0.002	0.993	0.97750
16	0.035	0.590	0.35875	52	0.001	0.994	0.98067
17	0.035	0.625	0.40250	53	0.001	0.995	0.98350
18	0.035	0.660	0.44500	54	0.001	0.996	0.98600
19	0.030	0.690	0.48583	55	0.001	0.997	0.98825
20	0.030	0.720	0.52500	56	0.001	0.998	0.99025
21	0.030	0.750	0.56250	57	0.001	0.999	0.99200
22	0.020	0.770	0.59792	58	0.001	1.000	0.99358
23	0.020	0.790	0.63125	59	0.000	1.000	0.99492
24	0.020	0.810	0.66250	60	0.000	1.000	0.99600
25	0.015	0.825	0.69167	61	0.000	1.000	0.99692
26	0.015	0.840	0.71875	62	0.000	1.000	0.99767
27	0.015	0.855	0.74375	63	0.000	1.000	0.99825
28	0.010	0.865	0.76667	64	0.000	1.000	0.99875
29	0.010	0.875	0.78750	65	0.000	1.000	0.99917
30	0.010	0.885	0.80625	66	0.000	1.000	0.99950
31	0.008	0.893	0.82317	67	0.000	1.000	0.99975
32	0.008	0.901	0.83825	68	0.000	1.000	0.99992
33	0.008	0.909	0.85150	69	0.000	1.000	1.00000
34	0.008	0.917	0.86375	70	0.000	1.000	1.00000
35	0.008	0.925	0.87500	71	0.000	1.000	1.00000
36	0.008	0.933	0.88525	72	0.000	1.000	1.00000

Exhibit 2

Calculation of Claim Development by Attachment Year

Attachment Year	Time to Reporting 12 mos	24 mos	36 mos	48 mos	60 mos	72 mos
1996	72	102	107	109	110	110
1997	74	100	104	108	108	108
1998	81	117	119	123	124	124
1999	85	120	126	127	127	
2000	82	107	110	113		
2001	94	131	137			
2002	86	118				
2003	90					
			Development Factor			
1996	1.417	1.049	1.019	1.009	1.000	
1997	1.351	1.040	1.038	1.000	1.000	
1998	1.444	1.017	1.034	1.008	1.000	
1999	1.412	1.050	1.008	1.000		
2000	1.305	1.028	1.027			
2001	1.394	1.046				
2002	1.372					
Average	1.385	1.038	1.025	1.004	1.000	
Cum.to Ulti.	1.481	1.069	1.030	1.004	1.000	

Exhibit 3

Calculation of Asserted Claim Emergence and Assignment to Hybrid Year

			Occurrence	Years Subsequent to Occurrence Year						
		y =	Year	+1	+2	+3	+4	+5	+6	Total
(a)	Cumulative Assertions		0.18917	0.66250	0.88525	0.96600	0.99600	1.00000	1.00000	
(b)	Remaining Unasserted at beginning of Year		1.00000	0.81083	0.33750	0.11475	0.03400	0.00400	0.00000	
(c)	Asserted During Year y		0.18917	0.47333	0.22275	0.08075	0.03000	0.00400	0.00000	1.00000
(d)	Probability IBNK Claim Asserted		0.18917	0.58376	0.66000	0.70370	0.88235	1.00000	1.00000	
(e)	Development Factor		1.481							
(f)	Attachments Moved to First Year		0.09093							
(g)	Acceleration		0.11214							
(h)	Incident Reporting Acceleration		0.28010	0.70035	0.89812	0.96981	0.99645	1.00000	1.00000	
(i)	Hybrid Year Assigned		0.28010	0.42025	0.19777	0.07169	0.02664	0.00355	0.00000	1.00000

Notes:

(a) from Exhibit 1.
(b) = 1.0 - (a) for prior year; ie 0.33750 = 1.0 - 0.66250
(c) = (a) - (a) for prior year; ie 0.47333 = 0.66250 - 0.18917
(d) = (c)/(b); ie 0.58376 = 0.47333 / 0.81083
(e) = from Exhibit 2.
(f) = (a) [(e)-1]; ie 0.09093 = 0.18917 [1.481 -1]
(g) = (f)/[1.0-(a)] ; ie 0.11214 = 0.09093 / [1.0 - 0.18917]
(h) = (a) +(g)[1.0-(a)]; ie 0.70035 = 0.66250 + 0.11214 [1- 0.66250]
(i) = (h) - (h) for prior year; ie 0.42025 = 0.70035 - 0.28010

Exhibit 4

Emergence of Assertions from One Occurrence Year

Hybrid Year		Years after Occurrence 0	+1	+2	+3	+4	+5	+6	Total
+0	New Assertions	0.18917	0.08420	0.00636	0.00036	0.00001	0.00000	0.00000	0.28010
	Remaining RBNA	0.09093	0.00673	0.00037	0.00001	0.00000	0.00000	0.00000	
	subtotal	0.28010	0.09093	0.00673	0.00037	0.00001	0.00000	0.00000	
+1	New Assertions		0.38913	0.02942	0.00162	0.00008	0.00000	0.00000	0.42025
	Remaining RBNA		0.03112	0.00170	0.00008	0.00000	0.00000	0.00000	
	subtotal		0.42025	0.03112	0.00170	0.00008	0.00000	0.00000	
+2	New Assertions			0.18697	0.01031	0.00048	0.00001	0.00000	0.19777
	Remaining RBNA			0.01080	0.00049	0.00001	0.00000	0.00000	
	subtotal			0.19777	0.01080	0.00049	0.00001	0.00000	
+3	New Assertions				0.06846	0.00318	0.00005	0.00000	0.07169
	Remaining RBNA				0.00323	0.00005	0.00000	0.00000	
	subtotal				0.07169	0.00323	0.00005	0.00000	
+4	New Assertions					0.02625	0.00039	0.00000	0.02664
	Remaining RBNA					0.00039	0.00000	0.00000	
	subtotal					0.02664	0.00039	0.00000	
+5	New Assertions						0.00355	0.00000	0.00355
	Remaining RBNA						0.00000	0.00000	
	subtotal						0.00355	0.00000	
+6	New Assertions							0.00000	0.00000
	Remaining RBNA							0.00000	
	subtotal							0.00000	
Total	New Assertions	0.18917	0.47333	0.22275	0.08075	0.03000	0.00400	0.00000	1.00000
	Remaining RBNA	0.09093	0.03785	0.01287	0.00381	0.00045	0.00000	0.00000	
	subtotal	0.28010	0.51118	0.23562	0.08456	0.03045	0.00400	0.00000	

Exhibit 4.a

Emergence of Assertions from One Occurrence Year
Assuming 0% Acceleration, ie Standard Claims-Made Year

Hybrid Year		Years after Occurrence 0	+1	+2	+3	+4	+5	+6	Total
+0	New Assertions	0.18917	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.18917
	Remaining RBNA	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
	subtotal	0.18917	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
+1	New Assertions		0.47333	0.00000	0.00000	0.00000	0.00000	0.00000	0.47333
	Remaining RBNA		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
	subtotal		0.47333	0.00000	0.00000	0.00000	0.00000	0.00000	
+2	New Assertions			0.22275	0.00000	0.00000	0.00000	0.00000	0.22275
	Remaining RBNA			0.00000	0.00000	0.00000	0.00000	0.00000	
	subtotal			0.22275	0.00000	0.00000	0.00000	0.00000	
+3	New Assertions				0.08075	0.00000	0.00000	0.00000	0.08075
	Remaining RBNA				0.00000	0.00000	0.00000	0.00000	
	subtotal				0.08075	0.00000	0.00000	0.00000	
+4	New Assertions					0.03000	0.00000	0.00000	0.03000
	Remaining RBNA					0.00000	0.00000	0.00000	
	subtotal					0.03000	0.00000	0.00000	
+5	New Assertions						0.00400	0.00000	0.00400
	Remaining RBNA						0.00000	0.00000	
	subtotal						0.00400	0.00000	
+6	New Assertions							0.00000	0.00000
	Remaining RBNA							0.00000	
	subtotal							0.00000	

Exhibit 4.b

Emergence of Assertions from One Occurrence Year
Assuming 100% Reporting, ie Occurrence Year

Hybrid Year		Years after Occurrence 0	+1	+2	+3	+4	+5	+6	Total
+0	New Assertions	0.18917	0.47333	0.22275	0.08075	0.03000	0.00400	0.00000	1.00000
	Remaining RBNA	0.81083	0.33750	0.11475	0.03400	0.00400	0.00000	0.00000	
	subtotal	1.00000	0.81083	0.33750	0.11475	0.03400	0.00400	0.00000	
+1	New Assertions		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Remaining RBNA		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
	subtotal		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
+2	New Assertions			0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	Remaining RBNA			0.00000	0.00000	0.00000	0.00000	0.00000	
	subtotal			0.00000	0.00000	0.00000	0.00000	0.00000	
+3	New Assertions				0.00000	0.00000	0.00000	0.00000	0.00000
	Remaining RBNA				0.00000	0.00000	0.00000	0.00000	
	subtotal				0.00000	0.00000	0.00000	0.00000	
+4	New Assertions					0.00000	0.00000	0.00000	0.00000
	Remaining RBNA					0.00000	0.00000	0.00000	
	subtotal					0.00000	0.00000	0.00000	
+5	New Assertions						0.00000	0.00000	0.00000
	Remaining RBNA						0.00000	0.00000	
	subtotal						0.00000	0.00000	
+6	New Assertions							0.00000	0.00000
	Remaining RBNA							0.00000	
	subtotal							0.00000	

Exhibit 5a

Exposure by Hybrid Year

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)
Occurrence	Equivalent	**Hybrid Year >**												
Year	Exposures	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7
Year -5	1,100	308	462	218	79	29	4	0						
Year -4	1,155		324	485	228	83	31	4	0					
Year -3	1,213			340	510	240	87	32	4	0				
Year -2	1,420				398	597	281	102	38	5	0			
Year -1	1,599					448	672	316	115	43	6	0		
Year 0	1,679						470	706	332	120	45	6	0	
Future Year	1,763							494	741	349	126	47	6	0
	Total	308	786	1,043	1,215	1,397	1,545							
Reported In Year +1								1,654						
Reported After Year +1											1,983			

Exhibit 5b

Claims by Hybrid Year

(a) Occurrence Year	(b) Equivalent Exposures	(p) Expected Frequency	(q) Expected # Claims
Year -5	1,100	0.0810	89
Year -4	1,155	0.0810	94
Year -3	1,213	0.0810	98
Year -2	1,420	0.0810	115
Year -1	1,599	0.0810	130
Year 0	1,679	0.0810	136
Future Year	1,763	0.0810	143

(a)	(q)	(r)	(s)	(t)	(u)	(v)	(w)	(x)	(y)	(z)	(aa)	(ab)	(ac)	(ad)
Occurrence	Number of	**Hybrid Year >**												
Year	Claims	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7
Year -5	89	25	37	18	6	3	0	0						
Year -4	94		26	40	18	7	3	0	0					
Year -3	98			27	42	19	7	3	0	0				
Year -2	115				32	49	22	9	3	0	0			
Year -1	130					36	55	26	9	4	0	0		
Year 0	136						38	57	27	10	4	0	0	
Future Year	143							40	60	28	11	3	1	0
	Total	25	63	85	98	114	125							
Reported In Year +1								135						
Reported After Year +1											160			

Exhibit 6

Claim Emergence By Hybrid Year as Evaluated at End of Year 0

Hybrid Year of Assignment

(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)
Occurrence	Number of	**Ultimate Claims**					
Year	Claims	Year -5	Year -4	Year -3	Year -2	Year -1	Year 0
Year -5	89	25	37	18	6	3	0
Year -4	94		26	40	18	7	3
Year -3	98			27	42	19	7
Year -2	115				32	49	22
Year -1	130					36	55
Year 0	136						38
	Total	25	63	85	98	114	125

(a)	(b)	(I)	(j)	(k)	(l)	(m)	(n)
Occurrence	Number of	**Cumulative Emergence of Assertions**					
Year	Claims	Year -5	Year -4	Year -3	Year -2	Year -1	Year 0
Year -5	89	25	37	18	6	3	0
Year -4	94		26	40	18	7	3
Year -3	98			27	42	19	7
Year -2	115				32	49	21
Year -1	130					35	51
Year 0	136						26
	Total	25	63	85	98	113	108

(a)	(b)	(o)	(p)	(q)	(r)	(s)	(t)
Occurrence	Number of	**RBNA at End of Period**					
Year	Claims	Year -5	Year -4	Year -3	Year -2	Year -1	Year 0
Year -5	89	0	0	0	0	0	0
Year -4	94		0	0	0	0	0
Year -3	98			0	0	0	0
Year -2	115				0	0	1
Year -1	130					1	4
Year 0	136						12
	Total	0	0	0	0	1	17

Exhibit 7

Calculation of Average Rate Relativity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Base	Territory			Classification			Step Factor			Schedule Rating		
Risk #	Rate	#	Rel.	Premium	Code	Rel.	Premium	Code	Rel.	Premium	Code	Rel.	Premium
1	6,422	1	1.00	6,422	1C	1.35	8,670	CMM	1.00	8,670	C1	0.95	8,237
2	6,422	1	1.00	6,422	2A	1.50	9,633	CM3	0.94	9,055	N	1.00	9,055
3	6,422	1	1.00	6,422	1B	1.00	6,422	CM2	0.88	5,651	D1	1.05	5,934
4	6,422	2	1.15	7,385	1A	0.90	6,647	CM0	0.30	1,994	N	1.00	1,994
5	6,422	3	1.25	8,028	1A	0.90	7,225	CMM	1.00	7,225	C1	0.95	6,864
6	6,422	3	1.25	8,028	2B	2.00	16,056	CMM	1.00	16,056	C3	0.85	13,648
7	6,422	4	1.50	9,633	8	6.00	57,798	CM3	0.94	54,330	N	1.00	54,330
8	6,422	4	1.50	9,633	3	2.25	21,674	CM2	0.88	19,073	N	1.00	19,073
9	6,422	2	1.15	7,385	1B	1.00	7,385	CMM	1.00	7,385	D2	1.10	8,124
10	6,422	3	1.25	8,028	1A	0.90	7,225	CMM	1.00	7,225	C2	0.90	6,503
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
Total	64,220			84,000			163,800			151,515			148,333
Change Factor			(4)/(1) =	1.308		(7)/(4) =	1.950		(10)/(7) =	0.925		(13)/(10) =	0.979

Notes: (4) = (1)(3)
(7) = (4)(6)
(10) = (7)(9)
(13) = (10)(12)

Exhibit 8

Company X

State Y

Physicians & Surgeons

Average Rate Relativity

Source of Relativity	Factor
Territory Relativity	1.308
Classification Relativity	1.950
Claims Made Year (Step Factor)	0.925
Schedule Rating Credit/Debit Factor	0.979
New to Practice Credit Factor	0.988
Part Time Credit Factor	0.962
Risk Management Credit Factor	0.996
Claim Free Credit Factor	0.938
Combined Average Factor	2.051

Exhibit 9

Company X

Countrywide

Physicians and Surgeons

All Other Loss Adjustment Expense Factor

(1) Claims Made Year	(2) Total L&LAE Incurred	(3) All Other Loss Expense Paid	(4) All Other Loss Expense Unpaid	(5) AO LAE Factor
2000	73,825,290	2,499,355	232,181	0.038
2001	81,730,727	2,010,576	441,346	0.031
2002	105,054,866	2,045,418	1,421,392	0.034
2003	114,113,914	1,848,645	2,259,456	0.037
2004	137,487,266	1,495,861	3,178,706	0.035
Total	512,212,063	9,899,856	7,533,080	0.035

Notes: Countrywide Experience is from Schedule P - Part 1F.
(5) = [(3)+(4)]/[(2)-(3)-(4)]

Exhibit 10

Company X

State Y

Physicians and Surgeons

Development of Pure Premium Trend
500/1000 Limits

Report Year	(1) Base Class Equivalent Earned Exposures	(2) Selected Ultimate Loss & DCC	(3) Base Class Pure Premium Y=(2)/(1)	(4) X
1997	987	3,918,390	3,970	1
1998	1,004	4,151,540	4,135	2
1999	1,100	4,973,100	4,521	3
2000	1,155	5,509,350	4,770	4
2001	1,213	6,286,979	5,183	5
2002	1,420	8,828,140	6,217	6
2003	1,599	9,430,902	5,898	7
2004	1,679	11,269,448	6,712	8
2005				

# Points	Correlation Coefficient	Annual Trend
8	0.965	11.6%
6	0.920	11.1%
4	0.770	4.9%
	Selected =	9.2%

Exhibit 11

Company X

State Y

Physicians and Surgeons

Development of Expense Constant and Variable Expense Factor

Variable Expense Components:	
1. Brokerage and Commissions	10.0%
2. Taxes, Licenses and Fees	2.5%
3. Underwriting Profit Reflecting Investment Income	-1.7%
4. Total Variable Expenses excluding L&LAE	10.8%
5. Variable Expense Factor = 1.0 - Variable Expenses	0.892
Fixed Expense Component:	
6. Other Acquisition Expenses	237,074
7. General Expenses	355,611
8. Total Fixed Expenses = (6) + (7)	592,685
9. Base Class Equivalent Exposures [Exhibit 5a]	1,679
10. Average Base Class Factor [Exhibit 8]	2.051
11. Exposures = (10) / (9)	819
12. Fixed Expense per Exposure = (8) / (11)	724
13. Expense Constant = (12) / (5)	812

Exhibit 12

Company X

State Y

Physicians & Surgeons

Rate Level Indication
500/1000 Limits

Hybrid Year	(a) Base Class Equivalent Exposures	(b) Earned Premium at Current Rates	(c) Ultimate Incurred L&LAE	(d) Trended # Ultimate Incurred L&LAE	(e) = (d)/(a) Trended Pure Premium
1997	987	7,139,958	4,056,450	9,359,683	9,483
1998	1,004	7,262,936	4,297,814	9,081,134	9,045
1999	1,100	7,957,400	5,148,321	9,961,745	9,056
2000	1,155	8,355,270	5,703,465	10,106,155	8,750
2001	1,213	8,774,842	6,508,493	10,560,998	8,707
2002	1,420	10,272,280	9,139,189	13,580,305	9,564
2003	1,599	11,567,166	9,763,188	13,285,286	8,308
2004	1,679	12,145,886	11,666,513	14,537,766	8,659
Total	10,157	73,475,738	56,283,434	90,473,071	8,907
00-04	7,066	51,115,444	42,780,848	62,070,509	8,784

1. Selected Claims Made L&LAE Pure Premium	8,784
2. Death, Disability and Retirement (DDR) Load	1.05
3. Claims Made Pure Premium with DDR Load = (1)(2)	9,223
4. Variable Expense Factor [Exhibit 11]	0.892
5. Calculated Variable Base Rate = (3) / (4)	10,340
6. Average Proposed Base Class Factor [Exhibit 8]	2.051
7. Average Increased Limit Factor	1.123
8. Average Variable Premium = (5)(6)(7)	23,816
9. Expense Constant [Exhibit 11]	812
10. Average Indicated Premium = (8) + (9)	24,628
11. Current Average Premium = (b) / actual unit earned exposure	17,474
12. Indicated Change = (10) / (11) -1	40.9%

Note: # Trended to one year beyond 1/1/2006 Effective Date.