



THE RESERVING ACTUARY AND UTILIZATION OF PRICING STUDIES TO ENHANCE RESERVE PROJECTIONS

MEDICAL PROFESSIONAL LIABILITY COVERAGE

Casualty Loss Reserve Seminar, Austin, Texas, September 2019

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NORCAL Group Presentation

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THE RESERVING ACTUARY AND UTILIZATION OF PRICING STUDIES TO ENHANCE RESERVE PROJECTIONS

Overview:

The Reserving and Pricing Actuaries both have unique roles to fill within the Corporate Landscape. However Each may in turn provide additional insights and feedback to each other with respect to segments they are analyzing. My presentation will provide examples of how the Reserving Actuary may benefit from Pricing Studies as they review each reserving segment. Four specific areas will be 1. Limits Evaluations, 2. New Insureds versus Tenured Insureds, 3. Large Group Account Pricing Trends and 4. Specialty Analysis

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1. Limits Evaluation:

- Distribution of Limits through Time– 8 years, Premium Volume, Percentages Changes, A snap shot of the most current Policy Year
- Limit Loss ratio Projections by Coverage years – Beware of Later emergence in Excess
- Excess Loss Ratios, Versus Ground Up experience for higher limits– Are they Consistent, or Exclusively Excess?
- Trends in Loss Ratios and Premium/Exposure Distributions
- Recent Rate actions for Pricing of Limits should be evaluated
- **Current Premium Volumes by limit, loss ratio performance by limit should provide additional insights to reserving actuary for more recent coverage years, and provide a better understanding of past trends**

**NORCAL Group
State of "Bayern" Physicians and Surgeons
Policy Year 2020 Rate Review**

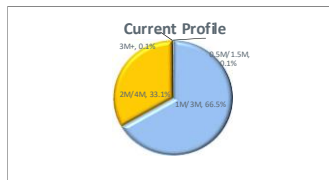
Exhibit Limits
Sheet 1

Distribution of Premium by Policy Limit

	2013	2014	2015	2016	2017	2018	4/30/2019
500,000/1,500,000	83,763	80,132	67,337	59,741	53,524	50,526	51,296
1,000,000/3,000,000	54,987,748	52,811,094	50,500,461	37,148,716	35,334,163	33,599,546	33,546,082
2,000,000/4,000,000	23,402,372	22,418,668	21,570,611	18,962,498	17,565,986	17,014,499	16,727,448
3,000,000/5,000,000	0	17,609	18,076	16,575	14,757	25,938	26,171
4,000,000/6,000,000	0	0	0	0	0	0	0
5,000,000/7,000,000	160,706	163,423	150,040	131,422	115,689	113,689	112,072
>SM	0	0	0	0	0	0	0
All Limits	78,634,579	75,490,926	72,308,525	56,318,952	53,074,119	50,804,208	50,483,089

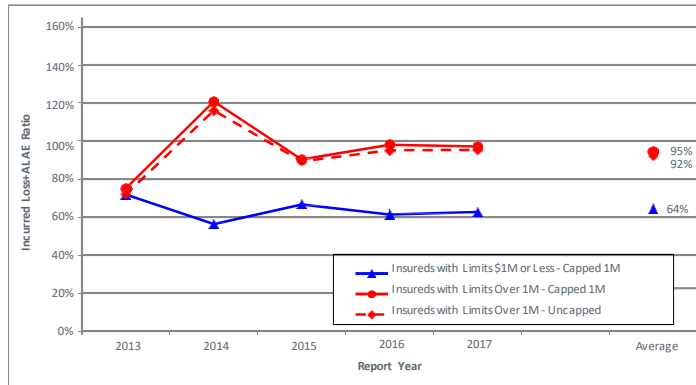
	2013	2014	2015	2016	2017	2018	4/30/2019
500,000/1,500,000	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
1,000,000/3,000,000	69.9%	70.0%	69.8%	66.0%	66.0%	66.1%	66.0%
2,000,000/4,000,000	29.8%	29.7%	29.8%	33.7%	33.1%	33.5%	33.1%
3,000,000/5,000,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
4,000,000/6,000,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5,000,000/7,000,000	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
>SM	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
All Limits	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Data is consolidated at the most common aggregate option.



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Loss Ratio Comparison of Primary Limit Insureds and High Limit Insureds
All Premium and Losses Limited to 1M



Take Away: \$1M Limits outperforming \$2M Limits
 The \$2M limits insureds are adding 8% points to the indicated increase
 The \$2M limits insureds poor loss ratio both in primary and excess layers
 The \$2M limits insureds poor loss ratio is 50% explained by specialty mix

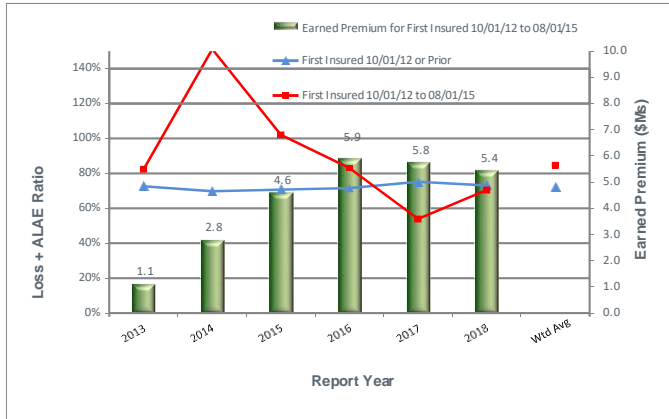
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2. New Insureds versus Tenured Insureds

- Incurred loss ratios for each coverage year for Tenured insureds versus New Insureds
- Two New Insured Cohorts Analyzed, new insureds with effective dates for most recent three years, another with effective dates from three years earlier
- Can observe trend lines of each coverage year relative to tenured insureds
- Can also determine if there is UW consistency in quality of book through time.
- In a well performing state it is more challenging to acquire a better performing new book of business
- **Helps determine if there is momentum in the most current writings, either favorable or less favorable – Insight to reserving actuary**

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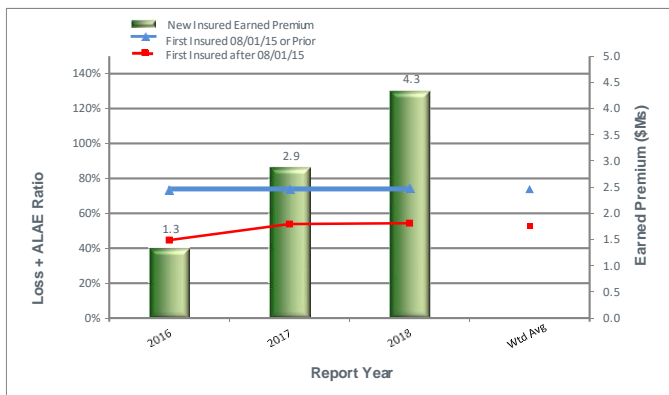
Loss Ratio Comparison of New vs Tenured Insureds
New Insured Loss Ratio



Take Away: Earlier cohort of new business emerged with higher loss ratio than tenured business (excludes New written after 8/1/15)

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Loss Ratio Comparison of New vs Tenured Insureds
New Insured Loss Ratio



Take Away: On an average, recent new business is outperforming tenured business. Maybe the effects of new credit implementation?

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3. Large Group Analysis:

- Establish a manual premium threshold of large group – perhaps 250K; manual vs written premium provides consistency on exposure level
- Determine Incurred loss ratio relative to entire book; an index of one indicates a loss ratio equal to statewide; provide indexes by coverage year to determine shock losses, or improving/eroding loss ratio
- For each group, current level loss ratios to current credit level of particular group, for a prospective view of most recent two coverage years
- Aggregate large group experience to see if this segment is growing, declining in volume, and the prospective trend in the loss ratio, as compared to historical book
- Closely monitor credit trends; current enforce credit level versus historical credit levels
- *Distinguish between groups that are enforce, versus the historical book, may provide an insight to direction of the quality of the large group book; this may help in the judgmental aspects of loss selections in the most recent coverage years for reserving actuaries*

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Exhibit Large Group
Sheet 1

Comparison of Loss Ratio of Large Group to Others

Large Group Name	Effective Date	In-Force Premium	% Premium	Relativities										Weighted Average Rat 2011-2017	Implied Loss Ratio	In-Force Avg Diso/Such	Prior In-Force Avg Diso/Such
				2011	2012	2013	2014	2015	2016	2017	2018	2019	2020				
Large Group A	1/1/2019	758,003	0.7%	0.287	0.093	2.458	0.250	0.332	1.028	2.035	0.481	1.141	82.9%	-64.0%	-64.8%		
Large Group B	1/1/2019	1,102,698	0.5%	-	-	0.000	0.085	1.409	5.148	0.551	1.754	2.023	147.0%	-84.3%	-85.5%		
Large Group C	6/1/2019	746,493	1.0%	0.548	0.418	0.331	0.529	7.645	3.769	1.839	0.576	2.230	182.1%	-13.6%	-22.8%		
Large Group D	9/1/2018	537,564	0.7%	0.138	5.822	0.403	0.573	2.243	0.317	10.134	0.082	2.830	205.7%	-23.2%	-27.0%		
Large Group E	-	-	0.1%	-	4.243	0.030	-	-	-	-	-	2.698	193.3%	-	-		
Large Group F	7/1/2018	255,795	0.5%	0.835	0.029	0.060	0.189	0.404	0.147	3.425	0.616	0.680	89.0%	-74.9%	-74.5%		
Large Group G	1/1/2019	290,896	0.4%	0.481	0.022	0.122	5.741	0.373	2.295	0.085	1.839	1.318	95.9%	-8.4%	-4.0%		
Large Group H	1/1/2019	189,588	0.4%	0.044	0.000	7.635	0.031	0.000	0.051	0.029	0.072	1.077	78.3%	-44.9%	-36.8%		
Large Group I	-	-	0.4%	0.421	0.722	0.184	0.223	1.272	-	-	-	0.499	38.3%	-	-		
Large Group J	1/1/2019	472,416	0.6%	0.049	0.031	0.059	0.411	0.340	0.422	0.220	1.148	0.248	17.9%	-63.2%	-63.5%		
Large Group K	-	-	0.3%	0.981	0.235	0.640	0.743	-	-	-	-	0.648	47.0%	-	-		
Large Group L	1/1/2019	362,171	0.6%	-	0.519	0.460	0.216	0.067	0.197	0.915	1.455	0.410	29.8%	-68.3%	-68.0%		
Large Group M	1/1/2019	398,696	0.9%	8.638	8.720	0.023	0.917	0.303	0.042	0.056	0.225	2.645	192.2%	-33.7%	-36.5%		
Large Group N	-	-	0.8%	4.037	1.983	1.048	0.794	0.478	0.978	-	-	1.291	93.8%	-	-		
Large Group O	1/1/2019	323,716	0.5%	3.784	2.698	0.415	0.183	1.287	4.209	1.799	7.174	1.958	142.2%	-39.2%	-48.4%		
Large Group P	1/1/2019	401,927	0.5%	0.000	0.019	2.297	2.342	0.032	0.006	0.034	0.185	0.698	47.9%	-30.0%	-30.1%		
Large Group Q	2/1/2019	932,034	1.0%	1.285	3.879	0.676	0.683	2.649	5.300	4.227	0.735	5.897	206.3%	-71.9%	-75.3%		
Large Group R	-	-	0.1%	5.523	-	-	-	-	-	-	-	5.523	491.5%	-	-		
Large Group S	-	-	0.3%	1.714	2.089	1.696	-	-	-	-	-	1.880	138.7%	-	-		
Large Group T	-	-	0.2%	0.540	0.307	0.258	1.100	0.203	-	-	-	0.429	31.2%	-	-		
Large Group U	-	-	0.6%	0.425	0.013	3.769	0.223	0.013	0.439	0.048	0.020	0.735	53.4%	-	-75.3%		
Large Group V	1/1/2019	501,729	0.5%	3.163	0.423	4.631	2.470	0.960	0.656	0.632	1.818	1.824	132.6%	5.1%	14.0%		
Large Group W	-	-	8.2%	2.622	1.305	1.370	1.049	0.757	-	-	-	1.315	95.6%	-	-		
Large Group X	-	-	0.7%	3.197	0.318	0.311	2.134	0.987	5.806	0.192	1.083	1.854	134.6%	-	-		
Large Group Total	-	-	18.1%	2.274	1.576	1.210	0.992	1.144	2.340	1.581	1.172	1.539	111.5%	-	-		
Large Group Total (Current Insured)	-	-	8,082,002	9.1%	1.960	2.011	1.149	1.070	1.798	2.574	1.995	1.820	132.3%	-	-		
Remainder of Bayern	-	-	-	81.9%	0.782	0.872	0.949	1.002	0.959	0.788	0.846	0.968	0.885	64.4%	-	-	
Bayern Total	-	-	-	100.0%	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	72.7%	-	-	

Note: Current Large Groups insureds

Takeaway: Progress made in large group accounts is disappointing. Deteriorating large group loss ratio reflects this.

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- 4. Specialty Analysis:**
- Run experience of the top 15 to 20 specialties, perhaps 80% of total premium volume, with remainder capturing smaller premium volume specialties
 - Determine projected loss ratios of each specialty utilizing Incurred loss ratio relativities, and current on leveling of premium for specialty specific class plan changes
 - Current credit levels should be monitored in aggregate, but enforce credit levels are less meaningful for specialties versus groups, as specialties are independent risks, and may move with quality of book
 - Very high credit levels for a specialty should be justified by projected loss ratios
 - **Specialty indexes, by coverage year, and current enforce premium mix can provide additional insights with respect to trends, to reserving actuary with respect to the general direction of the book**

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Exhibit Specialty
 Sheet 1

Loss Ratio by Specialties

Specialty	% of 2009-2018 Earned Premium	% In-Force Premium	Weighted Avg. Relativity	Implied Loss Ratio	Avg Credit In Force	Prior Avg Credit In Force
Specialty 1	12.9%	11.4%	0.966	70.2%	-36.6%	-32.5%
Specialty 2	9.2%	8.4%	1.008	73.3%	-38.4%	-32.6%
Specialty 3	7.4%	6.8%	0.821	59.7%	-28.6%	-28.0%
Specialty 4	6.4%	5.6%	0.935	68.0%	-39.5%	-33.4%
Specialty 5	4.0%	5.2%	1.666	121.1%	-29.1%	-28.8%
Specialty 6	5.0%	4.6%	0.766	55.7%	-37.6%	-33.7%
Specialty 7	5.6%	5.4%	0.979	71.1%	-50.9%	-41.5%
Specialty 8	4.2%	3.5%	0.654	47.5%	-30.2%	-29.5%
Specialty 9	3.7%	3.7%	0.999	72.6%	-34.4%	-32.8%
Specialty 10	2.9%	3.4%	0.724	52.6%	-34.3%	-22.7%
Specialty 11	1.8%	2.3%	1.348	98.0%	-33.9%	-35.1%
Specialty 12	2.3%	2.3%	1.488	108.2%	-34.5%	-30.9%
Specialty 13	1.5%	1.2%	1.230	89.4%	-22.5%	-13.4%
Specialty 14	1.6%	1.5%	1.368	99.4%	-38.6%	-35.9%
Specialty 15	2.1%	1.9%	0.870	63.2%	-30.0%	-21.6%
Specialty 16	2.0%	2.0%	0.834	60.6%	-32.2%	-29.1%
Specialty 17	1.9%	0.7%	0.365	26.6%	-44.2%	-25.7%
Specialty 18	1.6%	1.6%	0.823	59.8%	-28.8%	-22.9%
Specialty 19	1.3%	1.3%	2.359	171.4%	-38.4%	-35.8%
Specialty 20	1.6%	1.9%	1.104	80.3%	-36.2%	-32.6%
Specialty 21	1.7%	2.3%	0.739	53.7%	-21.1%	-18.9%
Specialty 22	1.2%	1.4%	0.922	67.0%	-29.5%	-27.4%
Specialty 23	1.0%	0.8%	1.735	126.2%	-34.8%	-24.8%
Specialty 24	1.1%	1.0%	1.664	121.0%	-46.7%	-41.9%
Specialty 25	0.8%	0.3%	0.961	69.9%	-11.4%	-10.0%
Specialty 26	1.1%	1.3%	1.436	104.4%	-23.7%	-21.5%
Specialty 27	1.2%	0.7%	0.123	8.9%	-33.5%	-31.5%
Specialty 28	0.9%	0.6%	1.762	128.1%	-29.9%	-3.1%
All Other Physician Specialties	19.5%	15.0%	0.895	65.1%	-32.6%	-30.4%
PHYSICIAN TOTAL	88.2%	66.1%	0.984	72.2%	-33.9%	-30.1%
Ancillary 1	0.0%	0.0%	0.633	46.0%	-43.3%	-32.5%
Ancillary 2	0.6%	0.9%	1.313	95.5%	-17.9%	-13.9%
Ancillary 3	0.6%	0.0%	1.969	143.1%	-13.9%	-13.5%
ANCILLARY TOTAL	1.7%	1.9%	1.332	96.8%	-21.2%	-16.9%
TOTAL	100.0%	100.0%	1.000	72.2%	-33.6%	-30.9%
						Impact on Indication
Low Loss Ratio Specialties	26.3%	24.8%	0.699	50.9%	-4.7%	
All Other Specialties	57.4%	58.1%	0.981	69.9%	+1.4%	
High Loss Ratio Specialties	16.3%	17.1%	1.622	118.0%	+11.9%	
State Total	100.0%	100.0%	1.000	72.2%		
Premium Shift Impact on Loss Ratio - vs Long Term				(Loss Ratio Worsening)	+1.1%	

Takeaway: Much of overall indication is driven by red specialties

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5. Other Considerations:

- Timely review of Pricing studies, at beginning of reserve study, or between 3Q and closing for updated information
- Consider meetings with Pricing Actuaries for major jurisdictions to provide an opportunity of Q/A and more detailed discussions than what exhibits alone can provide
- Each of the above segments are done from a univariate perspective; this has advantages, however consider utilizing a multivariate analysis subsequently to determine primary drivers and covariance levels
- For a multivariate example: $\text{Loss Ratio} = \text{Specialty X1} + \text{Group X2} + \text{Limit X3} + \text{Tenure X4} + \text{Interaction (X1,X2)} + \text{Interaction (X1,X3)} + \text{Epsilon}$
This can bring perspective to the impact of each variable, and how variables might interact with each other for beneficial or detrimental effects on the loss ratio.



Many opportunities exist to provide additional insight into prospective reserve projections from detailed pricing studies:

- *Segment Drivers of loss Ratio*
- *Momentum to most recent coverage years, either beneficial or detrimental*
- *Provides Reserving Actuary additional confidence of Qualitative decisions when Strategic Actions have been implemented for prospective impacts*

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