



AMERICAN ACADEMY *of* ACTUARIES

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May 20, 2010

To: Steven Ostlund  
Chair, Accident & Health Working Group  
National Association of Insurance Commissioners (NAIC)

From: Rowen Bell  
Chair, Medical Loss Ratio Regulation Work Group  
American Academy of Actuaries

Re: Response Regarding Statistical Credibility

Dear Steve:

The following comments are intended to supplement the American Academy of Actuaries'<sup>1</sup> Medical Loss Ratio Regulation Work Group letter of [May 12](#)<sup>2</sup> to you regarding maintaining statistical credibility in rebate calculations. It is meant to offer responses to the questions you have raised after reading that previous letter.

In that earlier letter, we presented two illustrative tables of potential credibility adjustments, each of which was consistent with a 90 percent confidence interval. You sought further clarification regarding the meaning of the confidence interval, and you expressed an interest in seeing the corresponding table for different confidence interval choices, particularly 50 percent.

The analysis underlying the tables shown in the May 12 letter started with an assumption that every group in the sample universe was priced to achieve an 80 percent MLR. Groups were randomly selected to form a certain market size, and the resulting MLR for the market was calculated using the groups' actual MLR from the prior year. This simulation procedure was replicated 1000 times for each of 25 market sizes ranging from 500 to 200,000. Using the distribution of 1000 simulations for each market size, confidence intervals can be calculated, such that P percent of the time the actual MLR lay within the interval (80% - x %, 80% + x%). This means that if x percent is added to the experience MLR, then 1/2(1-P %) of the time, the simulated company would be paying out a rebate even though the "true MLR" was 80 percent. As an example, in the 90 percent confidence interval table shown on page 4 of our May 12 letter, if there are 5,000 members then 10.3 percent would be added to the actual MLR, and 5 percent

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<sup>1</sup> The American Academy of Actuaries is a 16,000-member professional association whose mission is to serve the public on behalf of the U.S. actuarial profession. The Academy assists public policymakers on all levels by providing leadership, objective expertise, and actuarial advice on risk and financial security issues. The Academy also sets qualification, practice, and professionalism standards for actuaries in the United States.

<sup>2</sup> American Academy of Actuaries letter to the NAIC dated May 12, 2010 can be found at: [http://www.actuary.org/pdf/health/aaa\\_statistical\\_credibility\\_to\\_naic\\_051210\\_final.pdf](http://www.actuary.org/pdf/health/aaa_statistical_credibility_to_naic_051210_final.pdf).

of the time that would still produce an MLR below 80 percent and a rebate would be payable, even though the business had been priced to achieve an 80 percent MLR.

In particular, the confidence interval used in this analysis was a two-sided confidence interval. We asked the company that provided the analysis that was presented in the May 12 letter to produce the corresponding table of values for a 50 percent two-sided confidence interval, in which there would theoretically be a 25 percent chance that a rebate would be payable on business priced to achieve an 80 percent MLR, due to statistical fluctuation. (Note that the concept of a “50 percent one-sided confidence interval” is not meaningful here, since 50 percent of the time the actual MLR would be below the pricing MLR of 80 percent.) The table shown below is analogous to the table shown on page 4 of our May 12 letter, in that it does not reflect any pooling of large claims.

<b>Actual MLR – 50% Confidence Interval</b>		
<b>Average Members</b>	<b>Credibility Adjustment to MLR (tabular)</b>	<b>Credibility Adjustment to MLR (continuous)*</b>
200,000+	0.6%	0.7%
100,000 – 199,999	0.9%	1.0%
75,000 – 99,999	1.1%	1.1%
50,000 – 74,999	1.4%	1.4%
25,000 – 49,999	1.9%	1.9%
15,000 – 24,999	2.4%	2.5%
10,000 – 14,999	3.0%	3.1%
5,000 – 9,999	4.2%	4.3%
2,500 – 4,999	6.2%	6.2%
1,000 – 2,499	9.2%	9.6%
500 – 999	14.6%	13.6%
< 500	no credibility	no credibility

\*Continuous credibility formula fitted to the tabular data; percentages shown are the value of the formula applied to the left-end of the membership range. Formula is:  
 $1 \div \text{square root of } (10.7\% \times \text{Average Members})$

In trying to assess the impact of applying different magnitudes of credibility adjustment, the following perspective may be helpful. For example, assume that the company prices to an MLR of 80 percent and that statistical fluctuation is the only factor leading to variance between the actual MLR and the pricing MLR. If there were no rebates, then on average the impact of statistical fluctuation would net to zero, and the company’s expected MLR would be 80 percent. If there were rebates without any credibility adjustment, however, then the company’s expected net (post-rebate) MLR would be somewhat higher than 80 percent, because favorable statistical fluctuation would benefit customers rather than the insurer. The introduction of a credibility adjustment helps narrow the gap between the expected net post-rebate MLR and the pricing MLR of 80 percent; the larger the credibility adjustment, the closer the expected post-rebate MLR is to 80 percent.

The following table illustrates the concept discussed in the previous paragraph. It compares the 50 percent confidence interval factors shown in the table above against the corresponding factors

for a 90 percent confidence interval (shown in our May 12 letter) and an 80 percent confidence interval. The table also shows the expected post-rebate MLR for in each of those three cases, as well as the expected post-rebate MLR in the case in which there are no credibility adjustments. As you can see, applying adjustments with a confidence interval of 80 percent or 90 percent results in expected post-rebate MLRs that are relatively close to the pricing target MLR of 80 percent. However, a confidence interval of 50 percent results in an expected post-rebate MLR in excess of 81 percent for the smaller market sizes.

Actual MLR – Confidence Interval				Pricing at an 80% MLR			
Average Members	Credibility Adjustment to MLR (continuous)			Expected MLR after Rebates			
	50% CI	80% CI	90% CI	50% CI	80% CI	90% CI	No adjustment
200,000+	0.7%	1.3%	1.6%	80.12%	80.03%	80.01%	80.32%
100,000 – 199,999	1.0%	1.8%	2.3%	80.19%	80.05%	80.02%	80.54%
75,000 – 99,999	1.1%	2.1%	2.6%	80.22%	80.06%	80.02%	80.64%
50,000 – 74,999	1.4%	2.6%	3.2%	80.28%	80.07%	80.02%	80.81%
25,000 – 49,999	1.9%	3.7%	4.6%	80.37%	80.09%	80.02%	81.08%
15,000 – 24,999	2.5%	4.7%	5.9%	80.47%	80.11%	80.04%	81.43%
10,000 – 14,999	3.1%	5.8%	7.3%	80.58%	80.13%	80.03%	81.73%
5,000 – 9,999	4.3%	8.2%	10.3%	80.73%	80.14%	80.04%	82.41%
2,500 – 4,999	6.2%	11.7%	14.7%	80.93%	80.16%	80.04%	83.39%
1,000 – 2,499	9.6%	18.3%	22.9%	81.27%	80.14%	80.02%	85.00%
500 – 999	13.6%	25.8%	32.4%	81.28%	80.04%	80.00%	87.41%
< 500	No credibility	No credibility	No credibility	No credibility	No credibility	No credibility	No credibility

Percentages shown are the value of the formula applied to the left-end of the membership range. Expected MLR after rebates includes the credibility adjustment to MLR (continuous). Assumes normal distribution

Note that the expected post-rebate MLRs with no adjustment (shaded column above) highlight the need for a credibility adjustment approach. Because of the one-sided nature of a minimum MLR, pricing to the minimum MLR (which would reasonably be the minimum allowed in the rate review process) would result in expected MLRs higher than the minimum, in particular for smaller blocks of business.

Please note that the above study was motivated by the desire to understand the effect of volatility of year-by-year loss ratios on the ability of companies to manage to an 80 percent loss ratio under PPACA in the small group and individual markets. The greater the volatility the harder it is for a company to meet the 80 percent loss ratio. There are other significant risk factors contributing to the year-by-year volatility of the loss ratio that are not included in the above study; all involve uncertainty and have to be estimated in advance in order to set premium rates. These typically include medical trend, geographic adjustments to medical trend, underwriting wear-off (in the case of medically underwritten business), and adverse selection both at time of issue and at termination. To some extent, the use of three-year average results for rebates will allow carriers the ability to make some corrections for misestimates of these assumptions. However, the smaller the block, the more volatile the outcome and the harder it is to make an accurate assessment of the underlying causes of variations in actual from expected. Another

source of uncertainty, depending on choices made as to amount of claims runout incorporated in the state-level MLR calculation, could be estimation uncertainty in the projection of incurred claims.

As noted in our letter of May 12, this information represents a “good faith” estimate of the impact of volatility and credibility and is not based on a broad, exhaustive study of the industry. We believe using the higher confidence intervals would allow for inclusion of more of the various risks generating volatility in these markets. If desired, the Academy is willing to do more work in this area in order to assist regulators.

Given the short timeframe for the NAIC to make its recommendation to HHS, the NAIC may want to consider using credibility adjustments at a relatively high confidence interval to take into account these additional risk factors. The initial use of higher confidence intervals would allow for a more gradual transition for existing business into the new regulatory environment and less chance of significant market disruption. As experience emerges under the new legislation and regulations, there will be a greater understanding among all parties on the marketplace dynamics and consumer impact. This should permit subsequent controlled and managed revisions to the transition tolerances if appropriate.

Sincerely,

A handwritten signature in black ink, appearing to read "Rowen B. Bell". The signature is written in a cursive style with a large, prominent loop at the end.

Rowen B. Bell, FSA, MAAA  
Chairperson, Medical Loss Ratio Regulation Work Group  
American Academy of Actuaries