

Mary Jean King, FCAS, CERA, MAAA
SVP & Consulting Actuary
118 Warfield Road
Cherry Hill, NJ 08034
P:856.428.5961
mking@bynac.com



TENNESSEE ADVISORY COUNCIL ON WORKERS' COMPENSATION

ACTUARIAL REPORT

Review of NCCI Loss Cost Filing Effective 3/1/17

9/29/16

By The Numbers
Actuarial 
Consulting, Inc.

September 29, 2016

Mr. David H. Lillard, Jr., Tennessee State Treasurer
Chairman, Advisory Council on Workers' Compensation
State Capitol, 1st Floor
600 Charlotte Avenue
Nashville, Tennessee 37243-0225

Dear Mr. Lillard:

Enclosed is the actuarial report prepared for the Tennessee Advisory Council on Workers' Compensation. This report contains our review of the National Council on Compensation Insurance, Inc. (NCCI) filing effective 3/1/17.

The estimates and analysis contained in this report are based on data provided by NCCI including the technical supplement dated 8/22/16 and the answers to questions concerning the filing provided by NCCI. Any discrepancy in the completeness, interpretation, or accuracy of the information used may require a revision to this report.

If you have any questions, please call or write. It is a pleasure to be of service to the Advisory Council.

Sincerely,



Mary Jean King, FCAS, CERA, MAAA
Senior Vice President and Consulting Actuary



Lisa Dennison, FCAS, MAAA
President and Consulting Actuary

cc: Larry Scroggs
Administrator, Advisory Council on Workers' Compensation

TENNESSEE ADVISORY COUNCIL ON WORKERS' COMPENSATION

ACTUARIAL REPORT

TABLE OF CONTENTS

PURPOSE..... 1
FINDINGS..... 2
OVERVIEW OF FILING..... 4
 SUMMARY OF PROPOSED LOSS COST CHANGES 4
 OTHER PROPOSED CHANGES 4
 DATA 5
STATEWIDE INDICATION ANALYSIS 6
 OVERVIEW 6
 ANALYSIS OF METHODOLOGY..... 7
 DEVELOPMENT 9
 TREND 36
 LOSS ADJUSTMENT EXPENSE 40
QUALIFICATIONS AND LIMITATIONS..... 42
CONSULTATION..... 43

APPENDICES

BYNAC RECOMMENDATIONS..... 44
LARGE LOSS SUPPORTING DATA..... 46

TENNESSEE ADVISORY COUNCIL ON WORKERS' COMPENSATION

ACTUARIAL REPORT

PURPOSE

By the Numbers Actuarial Consulting, Inc. (BYNAC) has been retained by the Tennessee Advisory Council on Workers' Compensation to prepare this actuarial report to present a professional analysis of the National Council on Compensation Insurance, Inc. (NCCI) Tennessee Workers Compensation Voluntary Market Loss Costs and Rating Values and Assigned Risk Rates and Rating Values filing effective 3/1/17. The basis of the analysis is the NCCI filing memorandum dated 8/22/16 including the technical supplement, loss adjustment expense (LAE) analysis, and executive summary. BYNAC did not audit the premium or loss data underlying the NCCI filing, nor did we verify the accuracy of NCCI's detail calculations. An analysis of the federal classifications changes and the assigned risk multiplier is beyond the scope of this report.

The following items will be addressed in this report:

- An analysis of NCCI's methodology in arriving at its calculation of the proposed change in loss costs and loss adjustment expense.
- An examination of the appropriateness of the methodology used by NCCI in its selection of estimates employed to arrive at ultimate loss cost for past and forecast periods.
- An analysis of NCCI's selection of loss adjustment expense allowance.

FINDINGS

Based on BYNAC's review of the NCCI filing, the proposed overall average loss cost level change of -12.8% effective 3/1/17 has been reasonably calculated in accordance with actuarial standards of practice.

Due to the large amount of actuarial analysis underlying most of the exhibits in this filing, it is impossible to review all of the detail calculations in the time given for BYNAC's review. As in BYNAC's previous reviews of the NCCI Tennessee annual filing, certain procedures were selected for more detailed review. BYNAC's main focus in this review is an analysis of the paid loss development method for use in estimating ultimate losses.

BYNAC reviewed paid as well as paid + case development and experience for policy years 2010 through 2012 in addition to the policy years underlying the filing of 2013 and 2014 in order to test the assumptions made by NCCI in selecting the data and development methods for review. As indicated in the NCCI filing, there has been a dramatic improvement in the 2013 year experience since the 3/1/16 filing. The large swing supports the need for a longer experience period for the filing indication. The BYNAC experience indication is -9.3% compared to the NCCI experience indication of -12.9%.

BYNAC also reviewed the selection of trend. The NCCI selected trend factor is a change from 0.960 to 0.950 for indemnity and from 0.995 to 0.985 for medical. The decrease in both factors is still being driven by decreases in frequency. The indemnity cost per case adjusted to current

wage level has increased since the last period while medical cost per case has decreased slightly. BYNAC selected factors of 0.955 for indemnity and 0.990 for medical.

BYNAC reviewed historical information for defense and cost containment expense (DCCE) and adjusting and other expense (AOE) separately and combined. BYNAC believes that an LAE allowance of 19.8% would be more appropriate than the 20.1% allowance proposed by NCCI. The selection of 19.8% would result in an overall indication of -13.1% using NCCI's experience and trend change. The overall indication using BYNAC's experience and trend change and LAE selection is -9.5% (Appendix A).

OVERVIEW OF FILING

SUMMARY OF PROPOSED LOSS COST CHANGES

NCCI is proposing a decrease in loss costs based on premium and loss experience effective 3/1/17. The breakdown of the proposed changes by industry groups is as follows:

Industry Group	Loss Cost Change Eff 3/1/17
Manufacturing	-11.7%
Contracting	-13.8%
Office & Clerical	-13.7%
Goods & Services	-12.5%
Miscellaneous	-13.0%
Overall	-12.8%

OTHER PROPOSED CHANGES

In addition to the loss cost changes, NCCI has included in the filing class code changes, an update to the retrospective rating plan parameters, and changes to the assigned risk plan maximum minimum premium and expense constant. The calculations for the update to the retrospective rating plan parameters and the offset for the maximum minimum premium were not presented in the filing or technical supplement and were not reviewed for this report.

The statewide indication includes an increase of +0.1% to medical benefits for the estimated impact of the medical fee schedule update that was effective 1/1/16. In addition, the indication includes an increase of +0.3% to the indemnity benefits for changes in the minimum and

maximum weekly benefits effective 7/1/16. These changes were reasonably calculated in a manner similar to past filings.

DATA

The data used for the statewide indication is premium and losses for policy years 2013 and 2014, evaluated as of 12/31/15. The use of policy year data provides a good match of losses to the underlying policy premium and the policy years selected are the most recent available. NCCI has indicated that all concerns raised during the data validation process were resolved with the sending carriers with the exceptions noted below. Data for Lumbermens Underwriting Alliance was excluded from the Policy Year 2013 data in this report. Lumbermens is in liquidation as of 5/23/16. Combined voluntary and assigned risk data is used. Assigned risk represents approximately 10.3% of the policy year 2013 market share and 12.1% of 2014.

STATEWIDE INDICATION ANALYSIS

OVERVIEW

The statewide indicated change is based on premium and loss data for policy years 2013 and 2014. Standard earned premium is developed to ultimate to account for payroll audits that occur after the valuation date. Premium is then brought to the level of the current loss costs based on changes in loss costs since the experience period.

Two procedures are used to estimate the ultimate incurred losses. In the first method limited indemnity and medical paid losses plus case reserves are developed to ultimate. In the second method paid losses only are developed to ultimate. NCCI selected an average of the two methods as the best estimate of ultimate losses.

An on-level factor is also applied to losses to reflect changes to statutory benefit levels since the experience period. A separate indemnity and medical limited cost ratio is calculated. A projected cost ratio for the proposed policy period is then calculated by applying factors for trend, to adjust the losses to an unlimited basis, and for proposed changes in benefit levels. The medical and indemnity cost ratios are added to arrive at a projected cost ratio for each policy year. The average of the projected cost ratio for the two policy years is selected by NCCI.

Due to the change to the maximum minimum premium for assigned risk policies, an offset was calculated so that this change will be revenue neutral. This offset was calculated to apply to both voluntary and assigned risk premium.

The final component of the proposed change is the change in loss adjustment expense. The indicated change based on experience, trend, and benefits is multiplied by the maximum minimum premium offset and the effect of the proposed change in loss based expenses to calculate the proposed overall change.

Indicated Change Based on Experience, Trend, and Benefits:

Policy Year	Projected Cost Ratio		
	Indemnity	Medical	Combined
2013	0.256	0.616	0.872
2014	0.270	0.599	0.869
Selected			0.871

Offset Due to the Change in the Maximum Minimum Premium:

Offset	0.998
--------	-------

Change in Loss Based Expenses:

	DCCE Ratio	AOE Ratio	LAE Ratio
Current	0.127	0.071	0.198
Proposed	0.127	0.074	0.201
Change			1.003
Overall Change			-12.8%

ANALYSIS OF METHODOLOGY

The methodology used by NCCI to calculate the statewide indication is reasonable. Starting with the 3/1/16 filing, both paid and paid + case loss development are used in estimating ultimate losses. These are widely used and accepted methods. Inherent in the paid + case loss development technique is the assumption that there are no changes in reserving practices. The

paid loss development method provides a check to this assumption. Paid loss development assumes that there are no changes in claims settlement practices.

The use of on-level factors to bring premium to the current loss cost level is also a well-accepted technique. The best method would be to recalculate the premium using current loss costs but this would be overly complicated for a statewide indication based on all voluntary and assigned risk experience. The use of a Tennessee specific distribution of policy effective dates increases the accuracy of the on-level factor calculation. As a matter of simplicity, the most recent distribution is used for all policy years.

In selecting trend factors, NCCI examines claim frequency and severity separately, adjusts the severity to the current statutory benefit level, and also removes the impact of the growth in payroll over the experience period. NCCI then combines the historical frequency with the adjusted severity to produce loss ratio trend experience. Policy year loss ratio trend is used as the basis for the selection. The selection of trend factors involves a great deal of judgment and is subject to a wide range of opinion concerning the appropriate factor.

Five accident years of countrywide LAE data is presented as the basis for the LAE allowance. A relativity of Tennessee DCCE to countrywide DCCE is calculated based on the latest three calendar years paid data (2013– 2015). The state relativity (currently 0.960) is applied to the countrywide DCCE ratio. Countrywide AOE is used. A consistent pattern has been noted in the past in which the developed accident year expense ratios were decreasing with each new evaluation. As a result, NCCI has provided additional analysis of the estimated ultimate LAE ratios.

The methodology to limit losses in the development and trend calculations and adjust the limited cost ratio to an unlimited basis is the same as that used in the prior filing. This methodology was implemented in 2004 to temper the impact of one large claim on the overall statewide indication. The loss limitation threshold is based on pure premium and changes from year to year. The threshold for this filing is a decrease to \$7,518,887. The selected statewide excess ratio of 0.012 is a slightly larger than the ratio used in the prior filing of 0.011. An increase makes sense due to the decrease in the threshold.

A comparison of the adjustment factors in the current and prior filings is presented below:

	Most Recent Policy Year			Older Policy Year		
	Eff 3/1/17	Eff 3/1/16	Eff 3/1/15	Eff 3/1/17	Eff 3/1/16	Eff 3/1/15
Premium Development Factor	1.008	1.008	1.006	1.000	0.999	0.998
Indemnity Paid Development Factor	2.540	2.664		1.504	1.531	
Indemnity Paid Tail Factor	1.009	1.010				
Indemnity Paid+Case Development Factor	1.301	1.297	1.298	1.125	1.118	1.115
Indemnity Paid+Case Tail Factor	1.004	1.005	1.004			
Medical Paid Development Factor	2.236	2.277		1.821	1.836	
Medical Paid Tail Factor	1.160	1.168				
Medical Paid+Case Development Factor	1.424	1.473	1.464	1.368	1.403	1.386
Medical Paid+Case Tail Factor	1.047	1.048	1.039			
Indemnity Trend (Annual)	0.950	0.960	0.965			
Medical Trend (Annual)	0.985	0.995	1.000			
Loss Adjustment Expense	0.201	0.198	0.201			
Excess Loss Loading Factor	1.012	1.011	1.008			
Tennessee DCE Relativity	0.960	0.975	1.000			

DEVELOPMENT

The ultimate cost of claims incurred for a specific time period is usually not known until several years after the close of that period. Loss development factors project the additional cost expected on claims. The calculation and selection of development factors to be applied to paid + case indemnity losses are shown in Table 1, beginning with the age to age factors calculated

Table 1

**STATE OF TENNESSEE
WORKERS COMPENSATION**

INDEMNITY PAID + CASE DEVELOPMENT FACTORS

A. INDEMNITY PAID + CASE AGE TO AGE FACTORS

Policy Year	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8	8 - 9	9 - 10	10 - 11	11 - 12	12 - 13	13 - 14	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19-Ult
1992																			0.999
1993																	1.000	1.000	
1994																1.000	1.000	1.000	
1995															0.999	1.002	1.001	1.003	
1996														1.000	1.000	0.997	1.000	0.999	
1997													1.001	1.001	1.001	1.003	0.999		
1998												1.001	1.001	0.999	0.998	0.999			
1999											1.001	1.001	1.001	1.000	1.000				
2000										0.999	0.997	0.999	1.001	1.002					
2001									1.000	0.999	0.999	1.001	1.000						
2002								1.002	0.999	0.999	1.000	0.999							
2003							1.003	1.001	0.999	1.000	1.001								
2004						1.000	1.002	1.009	1.002	1.000									
2005					0.999	1.005	1.005	1.005	1.001										
2006				1.017	1.003	1.006	1.001	1.000											
2007			1.020	1.018	0.999	1.009	1.005												
2008		1.047	1.036	1.014	1.004	1.005													
2009	1.164	1.059	1.027	1.013	1.010														
2010	1.202	1.083	1.025	1.012															
2011	1.158	1.049	1.028																
2012	1.152	1.069																	
2013	1.102																		
5 Yr Avg	1.156	1.061	1.027	1.015	1.003	1.005	1.003	1.003	1.000	0.999	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	
3 Yr Avg	1.137	1.067	1.027	1.013	1.004	1.007	1.004	1.005	1.001	1.000	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	
5 Yr Mid	1.158	1.059	1.027	1.015	1.002	1.005	1.003	1.003	1.000	0.999	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	
2 Yr Avg	1.127	1.059	1.027	1.013	1.007	1.007	1.003	1.003	1.002	1.000	1.001	1.000	1.001	1.001	0.999	1.001	1.000	1.001	
NCCI Prior	1.160	1.059	1.025	1.014	1.002	1.004	1.002	1.004	1.000	0.999	0.999	1.000	1.001	1.000	0.999	1.001	1.001	1.000	1.004
NCCI Sel	1.156	1.061	1.027	1.015	1.003	1.005	1.003	1.003	1.000	0.999	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.003
BYNAC Sel	1.158	1.062	1.027	1.014	1.003	1.006	1.003	1.004	1.000	0.999	1.000	1.000	1.001	1.000	1.000	1.000	1.000	1.000	1.003

B. INDEMNITY PAID + CASE DEVELOPMENT FACTORS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	1.305	1.127	1.061	1.033	1.019	1.016	1.010	1.007	1.003	1.003	1.004	1.004	1.004	1.003	1.003	1.003	1.003	1.003	1.003

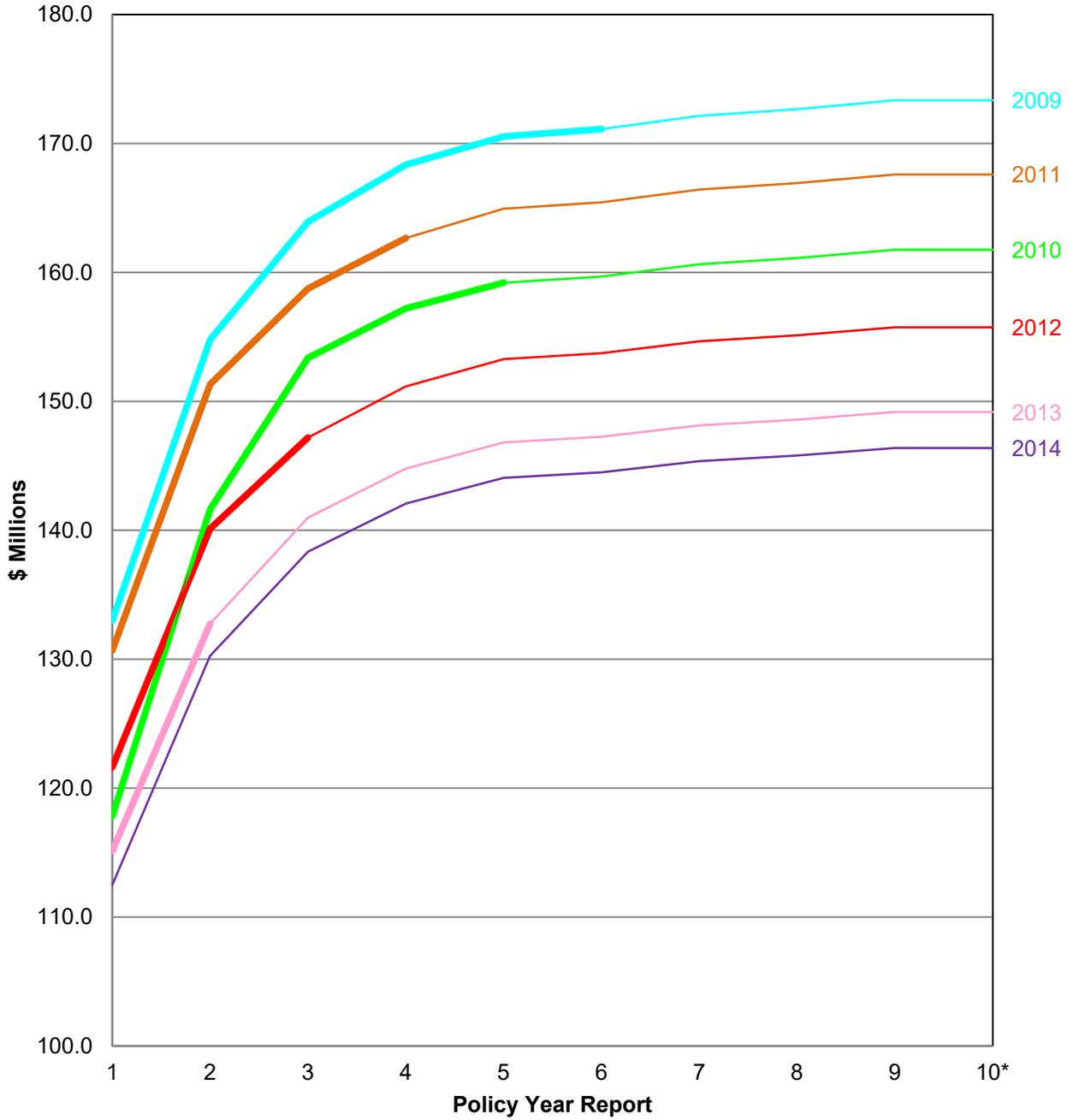
using Tennessee's limited paid + case policy year losses excluding LAE. The historical and expected loss development patterns are graphically illustrated in Figure 1 by thick and thin lines, respectively. Paid indemnity development is shown in Table 2 and Figure 2. Medical development follows in Tables 3 and 4 and Figures 3 and 4. For both indemnity and medical losses, NCCI selected 5 year average factors for the paid + case development and 2 year averages for the paid development. NCCI has indicated this is their usual practice. They believe that the use of a 2 year average for paid losses makes it more responsive to changes in payment patterns. For the paid + case development they have observed more fluctuations and feel that the 5 year average promotes stability. The NCCI selections are reasonable. However, BYNAC believes that a 3 year paid average would be preferable. The BYNAC selections are also shown on Tables 1 through 4. The BYNAC factors are judgmentally selected based on 3 year and 5 year averages and also a 5 year mid average which is the average of the 5 most recent age to age factors excluding the high and the low.

In an effort to evaluate the predictive capabilities of the various development methods, BYNAC created a comparison of the estimated ultimate losses from the 3/1/16 filing compared to the estimates in the 3/1/17 filing for policy years 2010 – 2013 shown in Table 5 (NCCI estimates) and Table 6 (BYNAC estimates). The estimates from the 3/1/16 filing were adjusted for the current mix of company data. Loss figures are shown in \$1,000's. While we do not expect the estimates to match we would hope that changes would appear random in nature with both positive and negative changes observed. This does seem to be the case with the indemnity changes to a certain extent with the NCCI selections and definitely with the BYNAC selections. Typically the magnitude of the changes decrease for older policy periods since more information

Figure 1

**STATE OF TENNESSEE
WORKERS COMPENSATION**

**HISTORICAL AND EXPECTED DEVELOPMENT OF PAID + CASE LOSSES
INDEMNITY**



* Additional development of 0.3% is expected after 10th report.

Table 2

**STATE OF TENNESSEE
WORKERS COMPENSATION**

INDEMNITY PAID DEVELOPMENT FACTORS

A. INDEMNITY PAID AGE TO AGE FACTORS

Policy Year	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8	8 - 9	9 - 10	10 - 11	11 - 12	12 - 13	13 - 14	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19-Ult
1992																			1.001
1993																	1.000	1.000	
1994																1.000	1.000	1.000	
1995															1.001	1.001	1.001	1.001	
1996														1.001	1.001	1.001	1.001	1.001	
1997													1.001	1.002	1.001	1.001	1.001	1.001	
1998												1.001	1.001	1.000	1.001	1.000			
1999											1.001	1.001	1.002	1.001	1.001				
2000										0.998	0.999	1.001	1.000	1.001					
2001									1.003	1.001	1.000	1.001	1.001						
2002								1.005	1.001	1.002	1.000	1.003							
2003							1.008	1.006	1.003	1.001	1.001								
2004						1.015	1.006	1.012	1.005	1.003									
2005					1.014	1.016	1.011	1.008	1.004										
2006				1.046	1.019	1.014	1.008	1.004											
2007			1.100	1.041	1.018	1.014	1.011												
2008		1.208	1.096	1.051	1.026	1.013													
2009	1.734	1.242	1.093	1.048	1.025														
2010	1.804	1.262	1.081	1.038															
2011	1.738	1.219	1.107																
2012	1.742	1.215																	
2013	1.636																		
5 Yr Avg	1.731	1.229	1.095	1.045	1.020	1.014	1.009	1.007	1.003	1.001	1.000	1.001	1.001	1.001	1.001	1.001	1.001	1.001	
3 Yr Avg	1.705	1.232	1.094	1.046	1.023	1.014	1.010	1.008	1.004	1.002	1.000	1.002	1.001	1.001	1.001	1.001	1.001	1.001	
5 Yr Mid	1.738	1.225	1.096	1.045	1.021	1.014	1.009	1.006	1.003	1.001	1.000	1.001	1.001	1.001	1.001	1.001	1.001	1.001	
2 Yr Avg	1.689	1.217	1.094	1.043	1.026	1.014	1.010	1.006	1.005	1.002	1.001	1.002	1.001	1.001	1.001	1.001	1.001	1.001	
NCCI Prior	1.740	1.241	1.087	1.050	1.022	1.014	1.010	1.010	1.004	1.002	1.000	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.010
NCCI Sel	1.689	1.217	1.094	1.043	1.026	1.014	1.010	1.006	1.005	1.002	1.001	1.002	1.001	1.001	1.001	1.001	1.001	1.001	1.009
BYNAC Sel	1.738	1.229	1.095	1.045	1.021	1.014	1.009	1.007	1.003	1.001	1.000	1.001	1.001	1.001	1.001	1.001	1.001	1.001	1.009

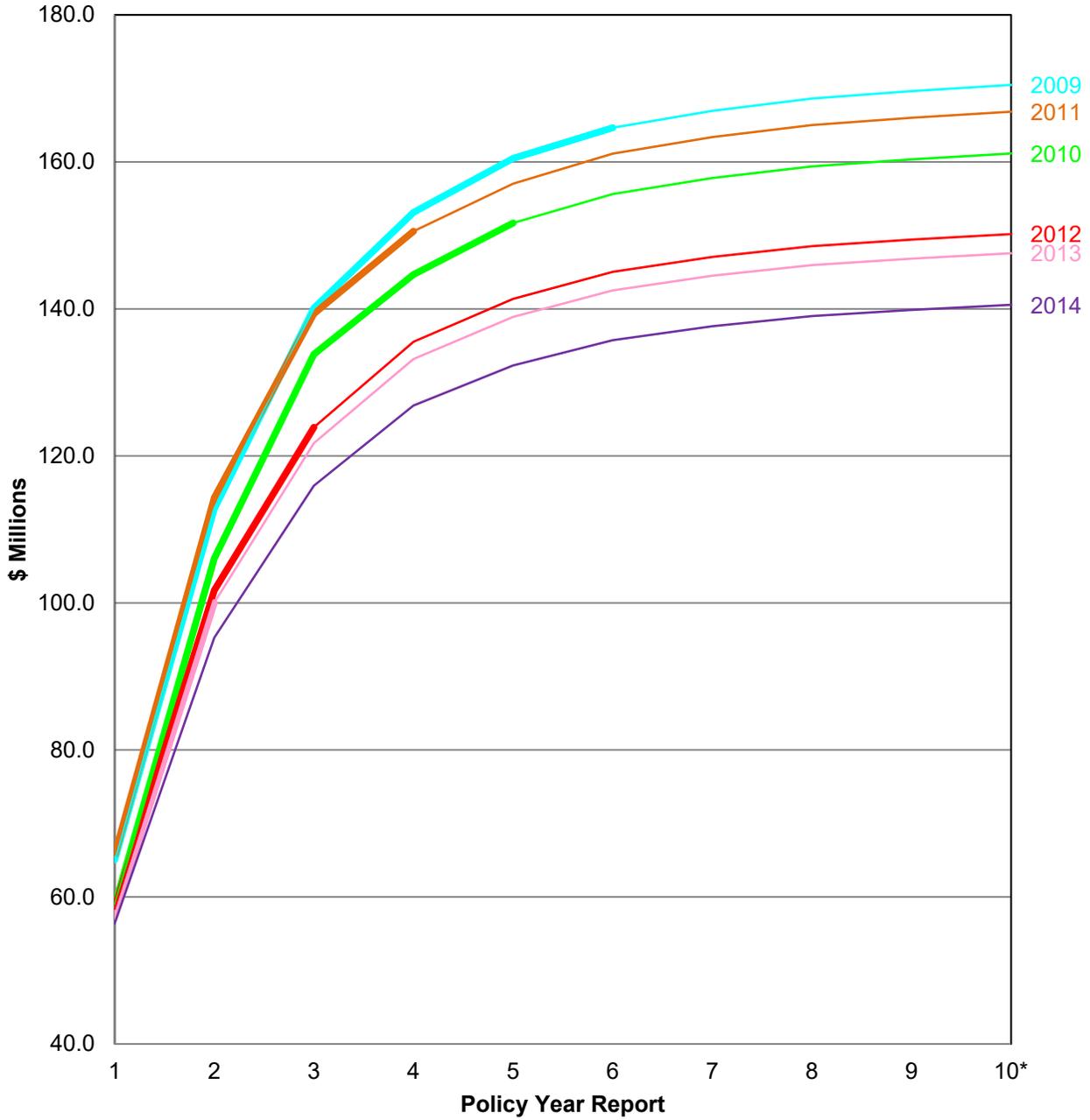
B. INDEMNITY PAID DEVELOPMENT FACTORS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2.621	1.508	1.227	1.121	1.073	1.051	1.036	1.027	1.020	1.017	1.016	1.016	1.015	1.014	1.013	1.012	1.011	1.010	1.009

Figure 2

**STATE OF TENNESSEE
WORKERS COMPENSATION**

**HISTORICAL AND EXPECTED DEVELOPMENT OF PAID LOSSES
INDEMNITY**



* Additional development of 1.7% is expected after 10th report.

Table 3

**STATE OF TENNESSEE
WORKERS COMPENSATION**

MEDICAL PAID + CASE DEVELOPMENT FACTORS

A. MEDICAL PAID + CASE AGE TO AGE FACTORS

Policy Year	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8	8 - 9	9 - 10	10 - 11	11 - 12	12 - 13	13 - 14	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - Ult
1992																			1.007
1993																	1.001	0.967	
1994																1.005	1.007	1.013	
1995															0.999	1.018	1.002	1.006	
1996														1.014	0.990	1.000	0.995	0.992	
1997													1.022	1.006	1.006	1.000	0.990		
1998												1.009	1.018	1.009	1.001	1.006			
1999											0.999	1.007	1.000	1.007	1.003				
2000										1.039	1.005	1.011	1.015	1.000					
2001									0.995	1.000	0.994	1.017	1.017						
2002								1.014	1.015	0.989	0.995	1.006							
2003							1.009	1.021	0.994	1.011	1.023								
2004						1.021	1.006	1.015	1.017	1.008									
2005					1.035	1.033	1.017	1.034	1.022										
2006				1.056	1.055	1.028	1.034	1.000											
2007			1.049	1.058	1.038	1.040	1.024												
2008		1.021	1.045	1.041	1.055	1.029													
2009	1.082	1.014	1.041	1.031	1.013														
2010	1.058	1.076	1.059	1.023															
2011	1.037	1.043	1.037																
2012	1.029	1.028																	
2013	0.955																		
5 Yr Avg	1.032	1.036	1.046	1.042	1.039	1.030	1.018	1.017	1.009	1.009	1.003	1.010	1.014	1.007	1.000	1.006	0.999	0.997	
3 Yr Avg	1.007	1.049	1.046	1.032	1.035	1.032	1.025	1.016	1.011	1.003	1.004	1.011	1.011	1.005	1.003	1.002	0.996	1.004	
5 Yr Mid	1.041	1.031	1.045	1.043	1.043	1.030	1.017	1.017	1.009	1.006	1.000	1.009	1.017	1.007	1.001	1.004	0.999	1.002	
2 Yr Avg	0.992	1.036	1.048	1.027	1.034	1.035	1.029	1.017	1.020	1.010	1.009	1.012	1.016	1.004	1.002	1.003	0.993	0.999	
NCCI Prior	1.050	1.039	1.048	1.046	1.043	1.028	1.017	1.018	1.007	1.016	1.000	1.013	1.012	1.010	1.000	1.007	1.003	1.000	1.037
NCCI Sel	1.041	1.036	1.046	1.042	1.039	1.030	1.018	1.017	1.009	1.009	1.003	1.010	1.014	1.007	1.000	1.006	0.999	0.997	1.035
BYNAC Sel	1.041	1.049	1.046	1.032	1.039	1.031	1.020	1.017	1.010	1.006	1.002	1.010	1.014	1.006	1.001	1.004	0.998	1.001	1.035

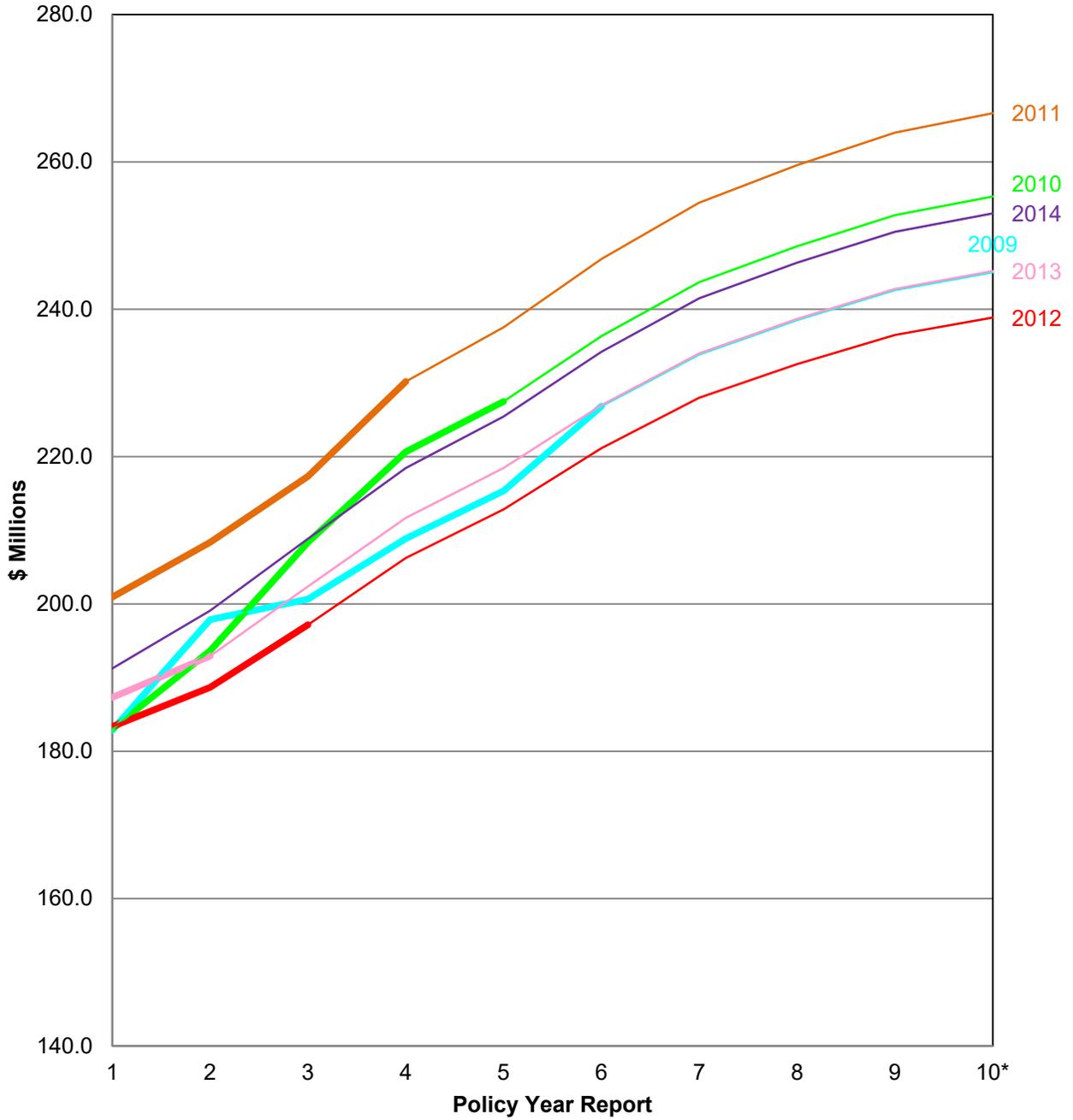
B. MEDICAL PAID + CASE DEVELOPMENT FACTORS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	1.428	1.372	1.308	1.250	1.211	1.166	1.131	1.109	1.090	1.079	1.073	1.071	1.060	1.045	1.039	1.038	1.034	1.036	1.035

Figure 3

**STATE OF TENNESSEE
WORKERS COMPENSATION**

**HISTORICAL AND EXPECTED DEVELOPMENT OF PAID + CASE LOSSES
MEDICAL**



* Additional development of 7.9% is expected after 10th report.

Table 4

**STATE OF TENNESSEE
WORKERS COMPENSATION**

MEDICAL PAID DEVELOPMENT FACTORS

A. MEDICAL AGE TO AGE FACTORS

Policy Year	1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8	8 - 9	9 - 10	10 - 11	11 - 12	12 - 13	13 - 14	14 - 15	15 - 16	16 - 17	17 - 18	18 - 19	19 - Ult
1991																			1.008
1992																	1.006	1.004	
1993																1.006	1.007	1.008	
1994															1.010	1.009	1.011	1.012	
1995														1.008	1.008	1.008	1.007	1.018	
1996													1.014	1.017	1.015	1.015	1.010		
1997												1.011	1.017	1.013	1.012	1.013			
1998											1.016	1.013	1.012	1.012	1.009				
1999										1.017	1.017	1.018	1.020	1.011					
2000									1.014	1.012	1.014	1.016	1.010						
2001								1.017	1.014	1.018	1.019	1.021							
2002							1.019	1.019	1.018	1.020	1.014								
2003						1.032	1.026	1.026	1.018	1.021									
2004					1.038	1.035	1.033	1.033	1.023										
2005				1.048	1.046	1.040	1.032	1.033											
2006			1.059	1.053	1.042	1.046	1.040												
2007		1.078	1.053	1.051	1.032	1.044													
2008	1.342	1.066	1.048	1.039	1.037														
2009	1.252	1.085	1.052	1.036															
2010	1.243	1.065	1.047																
2011	1.235	1.070																	
2012	1.221																		
5 Yr Avg	1.259	1.073	1.052	1.045	1.039	1.039	1.030	1.026	1.017	1.018	1.016	1.016	1.015	1.012	1.011	1.010	1.008	1.010	
3 Yr Avg	1.233	1.073	1.049	1.042	1.037	1.043	1.035	1.031	1.020	1.020	1.016	1.018	1.014	1.012	1.012	1.012	1.009	1.013	
5 Yr Mid	1.243	1.071	1.051	1.046	1.039	1.040	1.030	1.026	1.017	1.018	1.016	1.016	1.014	1.012	1.010	1.010	1.008	1.009	
2 Yr Avg	1.228	1.068	1.050	1.038	1.035	1.045	1.036	1.033	1.021	1.021	1.017	1.019	1.015	1.012	1.011	1.014	1.009	1.015	
NCCI Prior	1.240	1.075	1.050	1.045	1.039	1.043	1.033	1.030	1.018	1.019	1.017	1.017	1.016	1.013	1.014	1.012	1.009	1.010	1.168
NCCI Sel	1.228	1.068	1.050	1.038	1.035	1.045	1.036	1.033	1.021	1.021	1.017	1.019	1.015	1.012	1.011	1.014	1.009	1.015	1.160
BYNAC Sel	1.233	1.073	1.051	1.044	1.038	1.041	1.032	1.028	1.018	1.019	1.016	1.017	1.014	1.012	1.011	1.011	1.008	1.011	1.160

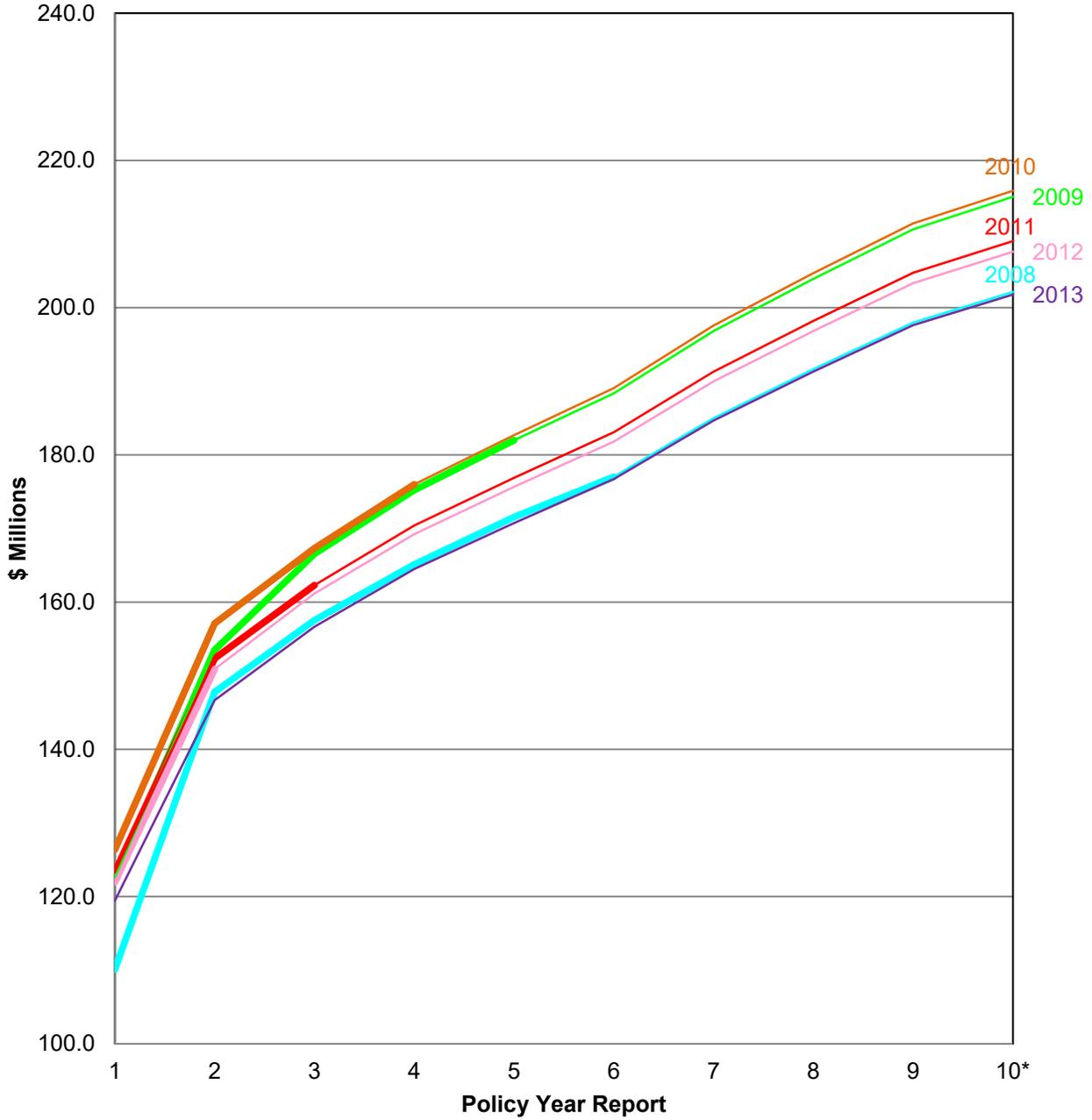
B. MEDICAL PAID LOSS DEVELOPMENT FACTORS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	2.210	1.792	1.670	1.589	1.522	1.466	1.408	1.364	1.327	1.304	1.280	1.260	1.239	1.222	1.208	1.195	1.182	1.173	1.160

Figure 4

**STATE OF TENNESSEE
WORKERS COMPENSATION**

**HISTORICAL AND EXPECTED DEVELOPMENT OF PAID LOSSES
MEDICAL**



* Additional development of 30.4% is expected after 10th report.

Table 5

**STATE OF TENNESSEE
WORKERS COMPENSATION**

COMPARISON OF NCCI ESTIMATED ULTIMATE LOSSES TO PRIOR REPORT

Policy Year	Estimated Ultimate 3/1/17 Filing (\$000)					
	Indemnity			Medical		
	Paid	Paid+Case	Selected	Paid	Paid+Case	Selected
2010	169,292	167,355	168,323	285,181	283,405	284,293
2011	154,832	155,797	155,314	275,475	257,106	266,291
2012	150,171	150,137	150,154	274,699	261,358	268,029
2013	138,838	139,477	139,158	265,557	249,859	257,708
2014	135,156	131,286	133,221	265,934	269,241	267,588
Total X2014	613,133	612,765	612,949	1,100,913	1,051,729	1,076,321

Policy Year	Adjusted Estimated Ultimate 3/1/16 Filing (\$000)*					
	Indemnity			Medical		
	Paid	Paid+Case	Selected	Paid	Paid+Case	Selected
2010	170,868	167,500	169,184	286,304	294,611	290,458
2011	152,700	155,085	153,893	276,718	265,330	271,024
2012	153,084	148,175	150,630	276,502	270,235	273,369
2013	150,286	145,906	148,096	272,049	281,752	276,901
Total	626,938	616,666	621,803	1,111,573	1,111,928	1,111,752

Policy Year	Change					
	Indemnity			Medical		
	Paid	Paid+Case	Selected	Paid	Paid+Case	Selected
2010	-1,576	-145	-861	-1,123	-11,206	-6,165
2011	2,132	712	1,421	-1,243	-8,224	-4,733
2012	-2,913	1,962	-476	-1,803	-8,877	-5,340
2013	-11,448	-6,429	-8,938	-6,492	-31,893	-19,193
Total	-13,805	-3,901	-8,854	-10,660	-60,199	-35,431

Policy Year	Change in Selected (3/1/17 Selected - 3/1/16)					
	Indemnity			Medical		
	Paid	Paid+Case	Selected	Paid	Paid+Case	Selected
2010	-2,545	823	-861	-2,011	-10,318	-6,165
2011	2,614	229	1,421	-10,427	961	-4,733
2012	-2,930	1,979	-476	-8,473	-2,206	-5,340
2013	-11,128	-6,748	-8,938	-14,341	-24,044	-19,193
Total	-13,989	-3,717	-8,854	-35,252	-35,607	-35,431

* Adjusted to mix of company data in 3/1/17 filing.

Table 6

**STATE OF TENNESSEE
WORKERS COMPENSATION**

COMPARISON OF BYNAC ESTIMATED ULTIMATE LOSSES TO PRIOR REPORT

Policy Year	Estimated Ultimate 3/1/17 Filing (\$000)					
	Indemnity			Medical		
	Paid	Paid+Case	Selected	Paid	Paid+Case	Selected
2010	167,729	167,684	167,706	277,345	283,405	280,375
2011	153,599	155,948	154,773	269,538	254,662	262,100
2012	149,078	150,278	149,678	269,060	258,982	264,021
2013	139,208	139,725	139,466	261,328	250,590	255,959
2014	139,466	131,689	135,577	262,842	269,998	269,998
Total X2014	609,612	613,635	611,623	1,077,272	1,047,639	1,062,455

Policy Year	Adjusted Estimated Ultimate 3/1/16 Filing (\$000)*					
	Indemnity			Medical		
	Paid	Paid+Case	Selected	Paid	Paid+Case	Selected
2010	168,610	167,663	168,137	278,034	294,382	286,208
2011	151,339	155,378	153,359	269,103	264,741	266,922
2012	150,984	148,440	149,712	268,219	271,198	269,709
2013	148,311	145,906	145,906	264,761	280,605	280,605
Total	619,244	617,387	617,114	1,080,117	1,110,926	1,103,444

Policy Year	Change					
	Indemnity			Medical		
	Paid	Paid+Case	Selected	Paid	Paid+Case	Selected
2010	-881	21	-431	-689	-10,977	-5,833
2011	2,260	570	1,414	435	-10,079	-4,822
2012	-1,906	1,838	-34	841	-12,216	-5,688
2013	-9,103	-6,181	-6,440	-3,433	-30,015	-24,646
Total	-9,632	-3,752	-5,491	-2,845	-63,287	-40,989
NCCI	-13,805	-3,901	-8,854	-10,660	-60,199	-35,431

Policy Year	Change in Selected (3/1/17 Selected - 3/1/16)					
	Indemnity			Medical		
	Paid	Paid+Case	Selected	Paid	Paid+Case	Selected
2010	-904	43	-431	2,341	-14,007	-5,833
2011	3,434	-605	1,414	-7,003	-2,641	-4,822
2012	-1,306	1,238	-34	-4,198	-7,177	-5,688
2013	-8,845	-6,440	-6,440	-8,802	-24,646	-24,646
Total	-7,621	-5,764	-5,491	-17,662	-48,471	-40,989
NCCI	-13,989	-3,717	-8,854	-35,252	-35,607	-35,431

* Adjusted to mix of company data in 3/1/17 filing.

is known with each passing year. On the medical side, all of the NCCI estimates have decreased since the 3/1/16 filing with the paid + case estimate for policy year 2013 decreasing by over \$30 million. This is concerning from two stand points. It seems to indicate a possible bias in the medical development factors. It also points out the problem with using only two years of experience in the filing indication. The 2013 year which with current information appears to have been overestimated by 7.0% made up 50% of the NCCI medical indication for 3/1/16. The comparison does indicate that the paid development method showed less volatility. More evaluations are needed to determine if the paid method was better than the paid + case in the projection of losses at 1st and 2nd report.

The observed medical paid + case age to age factor for policy year 2013 1st to 2nd report of 0.955 is lower than any prior factor going back to 2004. The next lowest is 1.028. NCCI has indicated that the decrease is primarily driven by decreases on three large claims. The claims are from different carriers and so at this point in time it is believed that the decrease does not indicate a change in settlement behavior. Due to the unusual nature of this particular factor, NCCI made an adjustment to their normal selection process and chose a 5-year average excluding the highest and lowest values instead of a simple 5-year average for this link ratio. BYNAC believes this adjustment is reasonable and necessary. However, BYNAC also believes that NCCI should increase the number of experience years used in the indication. In addition, BYNAC would make a similar adjustment to the indemnity factor for this period. The difference in the indemnity factor is not as dramatic as the medical factor but still less than all prior.

The standard earned premium also needs to be developed to ultimate to account for changes to earned premium such as payroll audits that are completed after the 1st report. Table 7 shows the

Table 7

**STATE OF TENNESSEE
WORKERS COMPENSATION**

PREMIUM DEVELOPMENT FACTORS

A. PREMIUM AGE TO AGE FACTORS

Policy Year	1 - 2	2 - 3	3 - 4	4 - 5	5-Ult
2006	1.007	0.998	1.001	1.000	
2007	1.002	0.998	1.000	1.000	
2008	0.987	0.996	1.000	1.000	
2009	1.001	0.996	1.000	1.000	
2010	1.008	1.000	1.000	1.000	
2011	1.014	1.000	1.000		
2012	1.006	0.999			
2013	1.005				
5 Yr Avg	1.004	0.998	1.000	1.000	
3 Yr Avg	1.008	1.000	1.000	1.000	
5 Yr Mid	1.006	0.998	1.000	1.000	
2 Yr Avg	1.006	1.000	1.000	1.000	
NCCI Prior	1.009	0.999	1.000	1.000	1.000
NCCI Sel	1.008	1.000	1.000	1.000	1.000
BYNAC Sel	1.006	0.999	1.000	1.000	1.000

B. PREMIUM LOSS DEVELOPMENT FACTORS

1	2	3	4	5
1.005	0.999	1.000	1.000	1.000

premium development with the NCCI and BYNAC selections. Age to age factors from prior filings are shown for the older policy periods. These factors are included to illustrate the range of usual factors. BYNAC selected the 5 year mid average due to the observed fluctuations in the age to age factors.

Table 8 shows both NCCI's and BYNAC's estimated ultimate losses and standard earned premium. For the losses, the NCCI selections are based on an average of the indicated ultimate losses using the paid + case and paid development methods. The BYNAC selections for 2010 through 2013 are also based on the average of the two methods using BYNAC's selected development factors. The BYNAC selection for 2014 is an average for indemnity and the paid + case method for medical. BYNAC believes it is prudent to use the paid + case method for this period due to the immaturity of the period. The larger number of claims in excess of \$500,000 for policy year 2014 (Appendix B) indicates that paid development for this policy period may lag prior periods. This would be more evident in the medical losses. The selections are illustrated in Figures 5 and 6.

The indicated loss cost level change for policy years 2010 through 2014 is presented in Table 9. A summary of the indications is provided in Table 10 and Figure 7. As shown, the indications for 2013 and 2014 are much lower than the three previous periods. BYNAC selected the average of the 2011 through 2014 BYNAC indications. BYNAC has extended the number of years used in the selected average due to the volatility.

Table 8

**STATE OF TENNESSEE
WORKERS COMPENSATION**

DETERMINATION OF PREMIUM AND LOSSES DEVELOPED TO ULTIMATE REPORT

Section A - Policy Year 2014 Experience		NCCI	BYNAC
(1)	Standard Earned Premium	\$594,821,185	\$594,821,185
(2)	Factor to Develop Premium to Ultimate	1.008	1.005
(3)	Standard Earned Premium Developed to Ultimate = (1)x(2)	\$599,579,754	\$597,795,291
(4)	Limited Indemnity Paid Losses	\$53,210,829	\$53,210,829
(5)	Limited Indemnity Paid Development Factor to Ultimate	2.540	2.621
(6)	Limited Indemnity Paid Losses Developed to Ultimate = (4)x(5)	\$135,155,506	\$139,465,583
(7)	Limited Indemnity Paid+Case Losses	\$100,911,374	\$100,911,374
(8)	Limited Indemnity Paid+Case Development Factor to Ultimate	1.301	1.305
(9)	Limited Indemnity Paid+Case Losses Developed to Ultimate = (7)x(8)	\$131,285,698	\$131,689,343
(10)	Policy Year 2014 Limited Indemnity Losses Developed to Ultimate NCCI and BYNAC = [(6)+(9)]/2	\$133,220,602	\$135,577,463
(11)	Limited Medical Paid Losses	\$118,933,038	\$118,933,038
(12)	Limited Medical Paid Development Factor to Ultimate	2.236	2.210
(13)	Limited Medical Paid Losses Developed to Ultimate = (11)x(12)	\$265,934,273	\$262,842,014
(14)	Limited Medical Paid+Case Losses	\$189,073,939	\$189,073,939
(15)	Limited Medical Paid+Case Development Factor to Ultimate	1.424	1.428
(16)	Limited Medical Paid+Case Losses Developed to Ultimate = (14)x(15)	\$269,241,289	\$269,997,585
(17)	Policy Year 2014 Limited Medical Losses Developed to Ultimate NCCI = [(13)+(16)]/2 BYNAC = (16)	\$267,587,781	\$269,997,585
Section B - Policy Year 2013 Experience		NCCI	BYNAC
(1)	Standard Earned Premium	\$616,235,670	\$616,235,670
(2)	Factor to Develop Premium to Ultimate	1.000	0.999
(3)	Standard Earned Premium Developed to Ultimate = (1)x(2)	\$616,235,670	\$615,619,434
(4)	Limited Indemnity Paid Losses	\$92,312,683	\$92,312,683
(5)	Limited Indemnity Paid Development Factor to Ultimate	1.504	1.508
(6)	Limited Indemnity Paid Losses Developed to Ultimate = (4)x(5)	\$138,838,275	\$139,207,526
(7)	Limited Indemnity Paid+Case Losses	\$123,979,492	\$123,979,492
(8)	Limited Indemnity Paid+Case Development Factor to Ultimate	1.125	1.127
(9)	Limited Indemnity Paid+Case Losses Developed to Ultimate = (7)x(8)	\$139,476,929	\$139,724,887
(10)	Policy Year 2013 Limited Indemnity Losses Developed to Ultimate NCCI and BYNAC = [(6)+(9)]/2	\$139,157,602	\$139,466,207
(11)	Limited Medical Paid Losses	\$145,830,551	\$145,830,551
(12)	Limited Medical Paid Development Factor to Ultimate	1.821	1.792
(13)	Limited Medical Paid Losses Developed to Ultimate = (11)x(12)	\$265,557,433	\$261,328,347
(14)	Limited Medical Paid+Case Losses	\$182,645,742	\$182,645,742
(15)	Limited Medical Paid+Case Development Factor to Ultimate	1.368	1.372
(16)	Limited Medical Paid+Case Losses Developed to Ultimate = (14)x(15)	\$249,859,375	\$250,589,958
(17)	Policy Year 2013 Limited Medical Losses Developed to Ultimate NCCI and BYNAC = [(13)+(16)]/2	\$257,708,404	\$255,959,153

Table 8

**STATE OF TENNESSEE
WORKERS COMPENSATION**

DETERMINATION OF PREMIUM AND LOSSES DEVELOPED TO ULTIMATE REPORT

Section C - Policy Year 2012 Experience		NCCI	BYNAC
(1)	Standard Earned Premium	\$617,920,653	\$617,920,653
(2)	Factor to Develop Premium to Ultimate	1.000	1.000
(3)	Standard Earned Premium Developed to Ultimate = (1)x(2)	\$617,920,653	\$617,920,653
(4)	Limited Indemnity Paid Losses	\$121,497,562	\$121,497,562
(5)	Limited Indemnity Paid Development Factor to Ultimate	1.236	1.227
(6)	Limited Indemnity Paid Losses Developed to Ultimate = (4)x(5)	\$150,170,987	\$149,077,509
(7)	Limited Indemnity Paid+Case Losses	\$141,638,330	\$141,638,330
(8)	Limited Indemnity Paid+Case Development Factor to Ultimate	1.060	1.061
(9)	Limited Indemnity Paid+Case Losses Developed to Ultimate = (7)x(8)	\$150,136,630	\$150,278,268
(10)	Policy Year 2012 Limited Indemnity Losses Developed to Ultimate NCCI and BYNAC = [(6)+(9)]/2	\$150,153,809	\$149,677,889
(11)	Limited Medical Paid Losses	\$161,113,772	\$161,113,772
(12)	Limited Medical Paid Development Factor to Ultimate	1.705	1.670
(13)	Limited Medical Paid Losses Developed to Ultimate = (11)x(12)	\$274,698,981	\$269,059,999
(14)	Limited Medical Paid+Case Losses	\$197,998,669	\$197,998,669
(15)	Limited Medical Paid+Case Development Factor to Ultimate	1.320	1.308
(16)	Limited Medical Paid+Case Losses Developed to Ultimate = (14)x(15)	\$261,358,243	\$258,982,259
(17)	Policy Year 2012 Limited Medical Losses Developed to Ultimate NCCI and BYNAC = [(13)+(16)]/2	\$268,028,612	\$264,021,129
Section D - Policy Year 2011 Experience		NCCI	BYNAC
(1)	Standard Earned Premium	\$590,509,029	\$590,509,029
(2)	Factor to Develop Premium to Ultimate	1.000	1.000
(3)	Standard Earned Premium Developed to Ultimate = (1)x(2)	\$590,509,029	\$590,509,029
(4)	Limited Indemnity Paid Losses	\$137,019,297	\$137,019,297
(5)	Limited Indemnity Paid Development Factor to Ultimate	1.130	1.121
(6)	Limited Indemnity Paid Losses Developed to Ultimate = (4)x(5)	\$154,831,806	\$153,598,632
(7)	Limited Indemnity Paid+Case Losses	\$150,965,669	\$150,965,669
(8)	Limited Indemnity Paid+Case Development Factor to Ultimate	1.032	1.033
(9)	Limited Indemnity Paid+Case Losses Developed to Ultimate = (7)x(8)	\$155,796,570	\$155,947,536
(10)	Policy Year 2011 Limited Indemnity Losses Developed to Ultimate NCCI and BYNAC = [(6)+(9)]/2	\$155,314,188	\$154,773,084
(11)	Limited Medical Paid Losses	\$169,627,660	\$169,627,660
(12)	Limited Medical Paid Development Factor to Ultimate	1.624	1.589
(13)	Limited Medical Paid Losses Developed to Ultimate = (11)x(12)	\$275,475,320	\$269,538,352
(14)	Limited Medical Paid+Case Losses	\$203,729,209	\$203,729,209
(15)	Limited Medical Paid+Case Development Factor to Ultimate	1.262	1.250
(16)	Limited Medical Paid+Case Losses Developed to Ultimate = (14)x(15)	\$257,106,262	\$254,661,511
(17)	Policy Year 2011 Limited Medical Losses Developed to Ultimate NCCI and BYNAC = [(13)+(16)]/2	\$266,290,791	\$262,099,932

Table 8

**STATE OF TENNESSEE
WORKERS COMPENSATION**

DETERMINATION OF PREMIUM AND LOSSES DEVELOPED TO ULTIMATE REPORT

Section E - Policy Year 2010 Experience	NCCI	BYNAC
(1) Standard Earned Premium	\$578,896,122	\$578,896,122
(2) Factor to Develop Premium to Ultimate	1.000	1.000
(3) Standard Earned Premium Developed to Ultimate = (1)x(2)	\$578,896,122	\$578,896,122
(4) Limited Indemnity Paid Losses	\$156,317,530	\$156,317,530
(5) Limited Indemnity Paid Development Factor to Ultimate	1.083	1.073
(6) Limited Indemnity Paid Losses Developed to Ultimate = (4)x(5)	\$169,291,885	\$167,728,710
(7) Limited Indemnity Paid+Case Losses	\$164,557,284	\$164,557,284
(8) Limited Indemnity Paid+Case Development Factor to Ultimate	1.017	1.019
(9) Limited Indemnity Paid+Case Losses Developed to Ultimate = (7)x(8)	\$167,354,758	\$167,683,872
(10) Policy Year 2010 Limited Indemnity Losses Developed to Ultimate NCCI and BYNAC = [(6)+(9)]/2	\$168,323,322	\$167,706,291
(11) Limited Medical Paid Losses	\$182,224,262	\$182,224,262
(12) Limited Medical Paid Development Factor to Ultimate	1.565	1.522
(13) Limited Medical Paid Losses Developed to Ultimate = (11)x(12)	\$285,180,970	\$277,345,327
(14) Limited Medical Paid+Case Losses	\$234,025,671	\$234,025,671
(15) Limited Medical Paid+Case Development Factor to Ultimate	1.211	1.211
(16) Limited Medical Paid+Case Losses Developed to Ultimate = (14)x(15)	\$283,405,088	\$283,405,088
(17) Policy Year 2010 Limited Medical Losses Developed to Ultimate NCCI and BYNAC = [(13)+(16)]/2	\$284,293,029	\$280,375,208

Figure 5

**STATE OF TENNESSEE
WORKERS COMPENSATION**

**SELECTED ESTIMATED ULTIMATE INCURRED LOSSES
INDEMNITY**

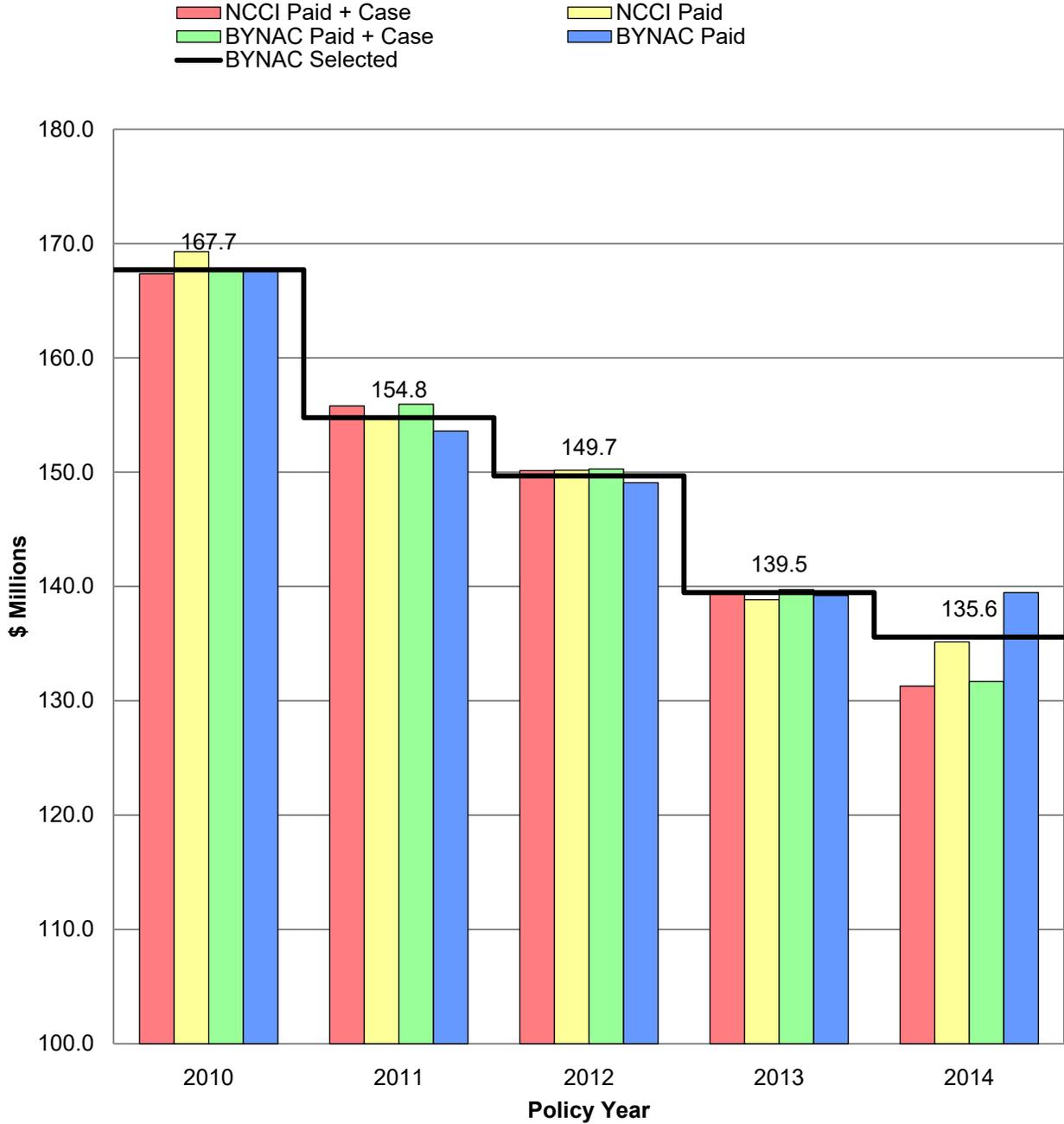


Figure 6

**STATE OF TENNESSEE
WORKERS COMPENSATION**

**SELECTED ESTIMATED ULTIMATE INCURRED LOSSES
MEDICAL**

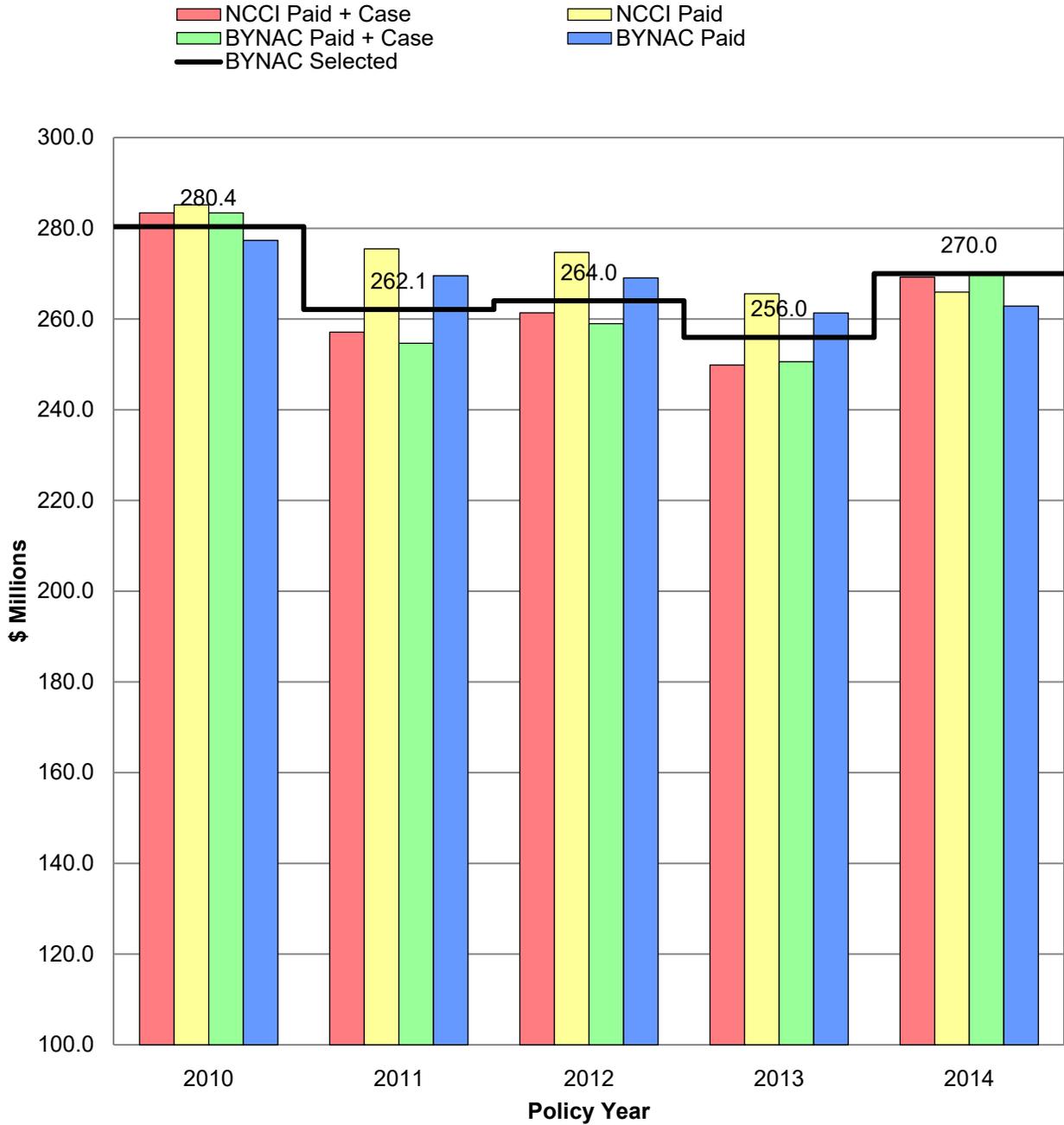


Table 9

**STATE OF TENNESSEE
WORKERS COMPENSATION**

DETERMINATION OF INDICATED LOSS COST LEVEL CHANGE

Section A - Policy Year 2014 Experience	<u>NCCI</u>	<u>BYNAC</u>
Premium:		
(1) Standard Earned Premium Developed to Ultimate (Table 8)	\$599,579,754	\$597,795,291
(2) Premium On-level Factor	0.693	0.693
(3) Premium Available for Benefit Costs = (1) x (2)	\$415,508,770	\$414,272,137
Indemnity Benefit Cost:		
(4) Limited Indemnity Losses Developed to Ultimate (Table 8)	\$133,220,602	\$135,577,463
(5) Indemnity Loss On-level Factor	0.971	0.971
(6) Adjusted Limited Indemnity Losses = (4) x (5)	\$129,357,205	\$131,645,717
(7) Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (6) / (3)	0.311	0.318
(8) Factor to Reflect Indemnity Trend	0.848	0.862
(9) Projected Limited Indemnity Cost Ratio = (7) x (8)	0.264	0.274
(10) Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis	1.012	1.012
(11) Projected Indemnity Cost Ratio = (9) x (10)	0.267	0.277
(12) Factor to Reflect Proposed Changes in Indemnity Benefits	1.010	1.010
(13) Projected Indemnity Cost Ratio including Benefit Changes = (11) x (12)	0.270	0.280
Medical Benefit Cost:		
(14) Limited Medical Losses Developed to Ultimate (Table 8)	\$267,587,781	\$269,997,585
(15) Medical Loss On-level Factor	0.965	0.965
(16) Adjusted Limited Medical Losses = (14) x (15)	\$258,222,209	\$260,547,670
(17) Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (16) / (3)	0.621	0.629
(18) Factor to Reflect Medical Trend	0.952	0.967
(19) Projected Limited Medical Cost Ratio = (17) x (18)	0.591	0.608
(20) Factor to Adjust Medical Cost Ratio to an Unlimited Basis	1.012	1.012
(21) Projected Medical Cost Ratio = (19) x (20)	0.598	0.615
(22) Factor to Reflect Proposed Changes in Medical Benefits	1.001	1.001
(23) Projected Medical Cost Ratio including Benefit Changes = (21) x (22)	0.599	0.616
Total Benefit Cost:		
(24) Indicated Change Based on Experience, Trend and Benefits = (13) + (23)	0.869	0.896

Table 9

**STATE OF TENNESSEE
WORKERS COMPENSATION**

DETERMINATION OF INDICATED LOSS COST LEVEL CHANGE

Section B - Policy Year 2013 Experience	NCCI	BYNAC
Premium:		
(1) Standard Earned Premium Developed to Ultimate (Table 8)	\$616,235,670	\$615,619,434
(2) Premium On-level Factor	0.623	0.623
(3) Premium Available for Benefit Costs = (1) x (2)	\$383,914,822	\$383,530,907
Indemnity Benefit Cost:		
(4) Limited Indemnity Losses Developed to Ultimate (Table 8)	\$139,157,602	\$139,466,207
(5) Indemnity Loss On-level Factor	0.855	0.855
(6) Adjusted Limited Indemnity Losses = (4) x (5)	\$118,979,750	\$119,243,607
(7) Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (6) / (3)	0.310	0.311
(8) Factor to Reflect Indemnity Trend	0.805	0.823
(9) Projected Limited Indemnity Cost Ratio = (7) x (8)	0.250	0.256
(10) Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis	1.012	1.012
(11) Projected Indemnity Cost Ratio = (9) x (10)	0.253	0.259
(12) Factor to Reflect Proposed Changes in Indemnity Benefits	1.010	1.010
(13) Projected Indemnity Cost Ratio including Benefit Changes = (11) x (12)	0.256	0.262
Medical Benefit Cost:		
(14) Limited Medical Losses Developed to Ultimate (Table 8)	\$257,708,404	\$255,959,153
(15) Medical Loss On-level Factor	0.966	0.966
(16) Adjusted Limited Medical Losses = (14) x (15)	\$248,946,318	\$247,256,542
(17) Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (16) / (3)	0.648	0.645
(18) Factor to Reflect Medical Trend	0.938	0.957
(19) Projected Limited Medical Cost Ratio = (17) x (18)	0.608	0.617
(20) Factor to Adjust Medical Cost Ratio to an Unlimited Basis	1.012	1.012
(21) Projected Medical Cost Ratio = (19) x (20)	0.615	0.624
(22) Factor to Reflect Proposed Changes in Medical Benefits	1.001	1.001
(23) Projected Medical Cost Ratio including Benefit Changes = (21) x (22)	0.616	0.625
Total Benefit Cost:		
(24) Indicated Change Based on Experience, Trend and Benefits = (13) + (23)	0.872	0.887

Table 9

**STATE OF TENNESSEE
WORKERS COMPENSATION**

DETERMINATION OF INDICATED LOSS COST LEVEL CHANGE

Section C - Policy Year 2012 Experience	<u>NCCI</u>	<u>BYNAC</u>
Premium:		
(1) Standard Earned Premium Developed to Ultimate (Table 8)	\$617,920,653	\$617,920,653
(2) Premium On-level Factor	0.593	0.593
(3) Premium Available for Benefit Costs = (1) x (2)	\$366,426,947	\$366,426,947
Indemnity Benefit Cost:		
(4) Limited Indemnity Losses Developed to Ultimate (Table 8)	\$150,153,809	\$149,677,889
(5) Indemnity Loss On-level Factor	0.850	0.850
(6) Adjusted Limited Indemnity Losses = (4) x (5)	\$127,630,738	\$127,226,206
(7) Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (6) / (3)	0.348	0.347
(8) Factor to Reflect Indemnity Trend	0.765	0.786
(9) Projected Limited Indemnity Cost Ratio = (7) x (8)	0.266	0.273
(10) Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis	1.012	1.012
(11) Projected Indemnity Cost Ratio = (9) x (10)	0.269	0.276
(12) Factor to Reflect Proposed Changes in Indemnity Benefits	1.010	1.010
(13) Projected Indemnity Cost Ratio including Benefit Changes = (11) x (12)	0.272	0.279
Medical Benefit Cost:		
(14) Limited Medical Losses Developed to Ultimate (Table 8)	\$268,028,612	\$264,021,129
(15) Medical Loss On-level Factor	0.953	0.953
(16) Adjusted Limited Medical Losses = (14) x (15)	\$255,431,267	\$251,612,136
(17) Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (16) / (3)	0.697	0.687
(18) Factor to Reflect Medical Trend	0.924	0.947
(19) Projected Limited Medical Cost Ratio = (17) x (18)	0.644	0.650
(20) Factor to Adjust Medical Cost Ratio to an Unlimited Basis	1.012	1.012
(21) Projected Medical Cost Ratio = (19) x (20)	0.652	0.658
(22) Factor to Reflect Proposed Changes in Medical Benefits	1.001	1.001
(23) Projected Medical Cost Ratio including Benefit Changes = (21) x (22)	0.653	0.659
Total Benefit Cost:		
(24) Indicated Change Based on Experience, Trend and Benefits = (13) + (23)	0.925	0.938

Table 9

**STATE OF TENNESSEE
WORKERS COMPENSATION**

DETERMINATION OF INDICATED LOSS COST LEVEL CHANGE

Section D - Policy Year 2011 Experience	<u>NCCI</u>	<u>BYNAC</u>
Premium:		
(1) Standard Earned Premium Developed to Ultimate (Table 8)	\$590,509,029	\$590,509,029
(2) Premium On-level Factor	0.609	0.609
(3) Premium Available for Benefit Costs = (1) x (2)	\$359,619,999	\$359,619,999
Indemnity Benefit Cost:		
(4) Limited Indemnity Losses Developed to Ultimate (Table 8)	\$155,314,188	\$154,773,084
(5) Indemnity Loss On-level Factor	0.853	0.853
(6) Adjusted Limited Indemnity Losses = (4) x (5)	\$132,483,002	\$132,021,441
(7) Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (6) / (3)	0.368	0.367
(8) Factor to Reflect Indemnity Trend	0.727	0.751
(9) Projected Limited Indemnity Cost Ratio = (7) x (8)	0.268	0.276
(10) Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis	1.012	1.012
(11) Projected Indemnity Cost Ratio = (9) x (10)	0.271	0.279
(12) Factor to Reflect Proposed Changes in Indemnity Benefits	1.010	1.010
(13) Projected Indemnity Cost Ratio including Benefit Changes = (11) x (12)	0.274	0.282
Medical Benefit Cost:		
(14) Limited Medical Losses Developed to Ultimate (Table 8)	\$266,290,791	\$262,099,932
(15) Medical Loss On-level Factor	0.904	0.904
(16) Adjusted Limited Medical Losses = (14) x (15)	\$240,726,875	\$236,938,339
(17) Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (16) / (3)	0.669	0.659
(18) Factor to Reflect Medical Trend	0.910	0.937
(19) Projected Limited Medical Cost Ratio = (17) x (18)	0.609	0.617
(20) Factor to Adjust Medical Cost Ratio to an Unlimited Basis	1.012	1.012
(21) Projected Medical Cost Ratio = (19) x (20)	0.616	0.624
(22) Factor to Reflect Proposed Changes in Medical Benefits	1.001	1.001
(23) Projected Medical Cost Ratio including Benefit Changes = (21) x (22)	0.617	0.625
Total Benefit Cost:		
(24) Indicated Change Based on Experience, Trend and Benefits = (13) + (23)	0.891	0.907

Table 9

**STATE OF TENNESSEE
WORKERS COMPENSATION**

DETERMINATION OF INDICATED LOSS COST LEVEL CHANGE

Section E - Policy Year 2010 Experience	NCCI	BYNAC
Premium:		
(1) Standard Earned Premium Developed to Ultimate (Table 8)	\$578,896,122	\$578,896,122
(2) Premium On-level Factor	0.592	0.592
(3) Premium Available for Benefit Costs = (1) x (2)	\$342,706,504	\$342,706,504
Indemnity Benefit Cost:		
(4) Limited Indemnity Losses Developed to Ultimate (Table 8)	\$168,323,322	\$167,706,291
(5) Indemnity Loss On-level Factor	0.861	0.861
(6) Adjusted Limited Indemnity Losses = (4) x (5)	\$144,926,380	\$144,395,117
(7) Adjusted Limited Indemnity Cost Ratio excluding Trend and Benefits = (6) / (3)	0.423	0.421
(8) Factor to Reflect Indemnity Trend	0.691	0.717
(9) Projected Limited Indemnity Cost Ratio = (7) x (8)	0.292	0.302
(10) Factor to Adjust Indemnity Cost Ratio to an Unlimited Basis	1.012	1.012
(11) Projected Indemnity Cost Ratio = (9) x (10)	0.296	0.306
(12) Factor to Reflect Proposed Changes in Indemnity Benefits	1.010	1.010
(13) Projected Indemnity Cost Ratio including Benefit Changes = (11) x (12)	0.299	0.309
Medical Benefit Cost:		
(14) Limited Medical Losses Developed to Ultimate (Table 8)	\$284,293,029	\$280,375,208
(15) Medical Loss On-level Factor	0.914	0.914
(16) Adjusted Limited Medical Losses = (14) x (15)	\$259,843,829	\$256,262,940
(17) Adjusted Limited Medical Cost Ratio excluding Trend and Benefits = (16) / (3)	0.758	0.748
(18) Factor to Reflect Medical Trend	0.897	0.928
(19) Projected Limited Medical Cost Ratio = (17) x (18)	0.680	0.694
(20) Factor to Adjust Medical Cost Ratio to an Unlimited Basis	1.012	1.012
(21) Projected Medical Cost Ratio = (19) x (20)	0.688	0.702
(22) Factor to Reflect Proposed Changes in Medical Benefits	1.001	1.001
(23) Projected Medical Cost Ratio including Benefit Changes = (21) x (22)	0.689	0.703
Total Benefit Cost:		
(24) Indicated Change Based on Experience, Trend and Benefits = (13) + (23)	0.988	1.012

Table 10

**STATE OF TENNESSEE
WORKERS COMPENSATION**

DETERMINATION OF INDICATED LOSS COST LEVEL CHANGE

Indicated Change Based on Experience, Trend, and Benefits

Policy Year	NCCI	BYNAC
2010	0.988	1.012
2011	0.891	0.907
2012	0.925	0.938
2013	0.872	0.887
2014	0.869	0.896
NCCI Selected	0.871	
BYNAC Selected		0.907

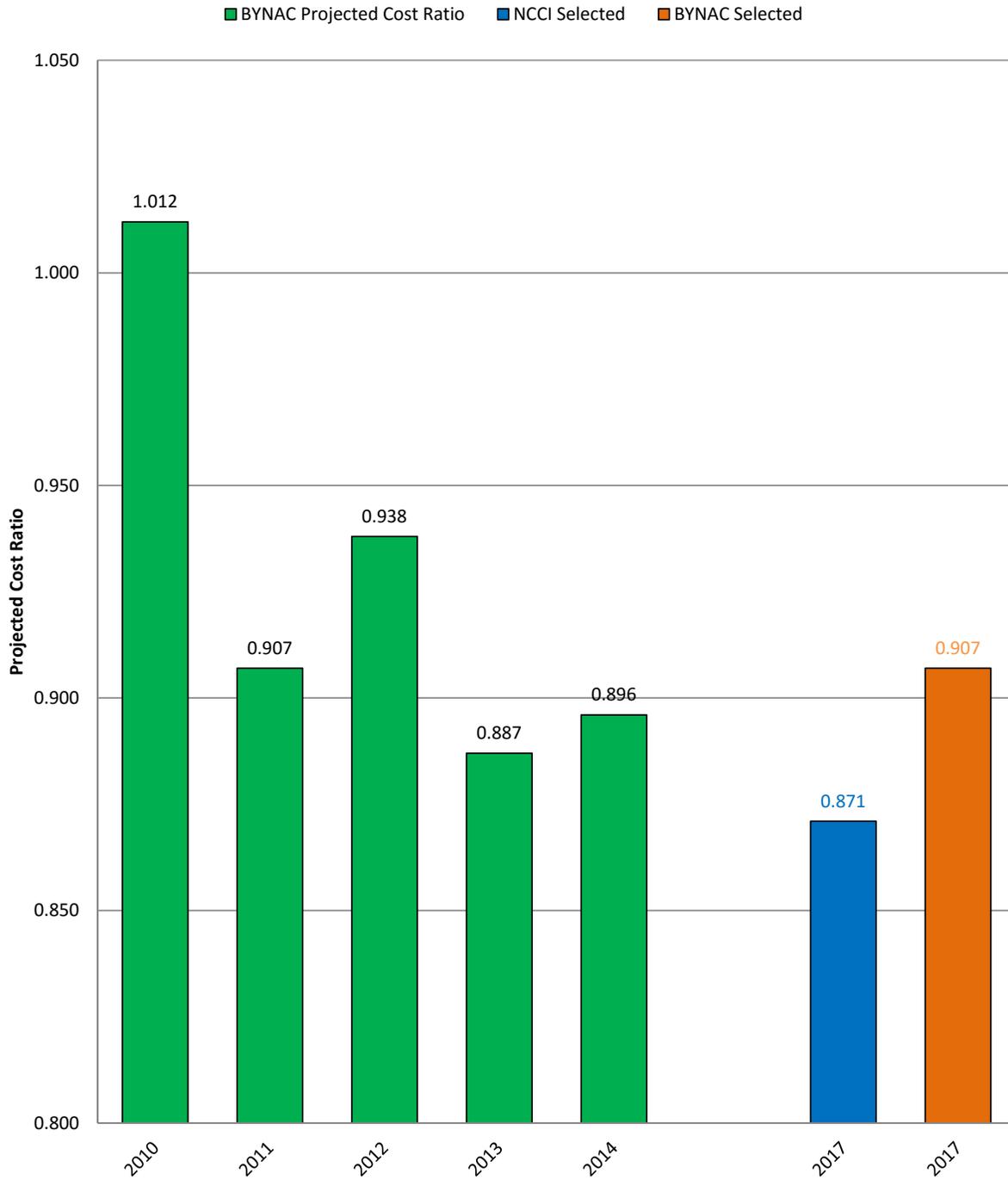
Application of the Premium Offset and Change in Loss-based Expenses

Indicated Loss Cost Level Change	0.871	0.907
Offset Due to the Change in the Maximum Minimum Premium Offset	0.998	0.998
Indicated Changed Modified for Max Min Change	0.869	0.905
Effect of the Change In Loss-Based Expenses Effect	1.003	1.000
Indicated Change Modified for Expense Change	0.872	0.905
Indicated Change as Percentage	-12.8%	-9.5%

Figure 7

**STATE OF TENNESSEE
WORKERS COMPENSATION**

PROJECTED COST RATIO INCLUDING TREND AND BENEFIT CHANGES



TREND

An exponential regression model is used to measure the trend and is presented in Table 11 and Figures 8 and 9. The NCCI selected trend factors are slightly lower than the 15 year exponential fit. BYNAC agrees that the most recent information indicates lower trends but feels that the use of the 15 year period is warranted and would recommend the factors 0.955 for indemnity and 0.990 for medical.

Table 11

**STATE OF TENNESSEE
WORKERS COMPENSATION**

Policy Year	TREND	
	Indemnity Loss Ratio	Medical Loss Ratio
2000	0.584	0.742
2001	0.583	0.722
2002	0.532	0.733
2003	0.542	0.784
2004	0.506	0.803
2005	0.466	0.772
2006	0.498	0.778
2007	0.468	0.815
2008	0.428	0.749
2009	0.431	0.802
2010	0.423	0.758
2011	0.368	0.669
2012	0.348	0.697
2013	0.310	0.648
2014	0.311	0.621
5 year Exponential	0.924	0.958
8 year Exponential	0.939	0.963
15 year Exponential	0.956	0.990
NCCI Prior Selected	0.960	0.995
NCCI Selected	0.950	0.985
BYNAC Selected	0.955	0.990

Figure 8

STATE OF TENNESSEE WORKERS COMPENSATION
15 Year Exponential Fit of Loss Ratio Trend Data

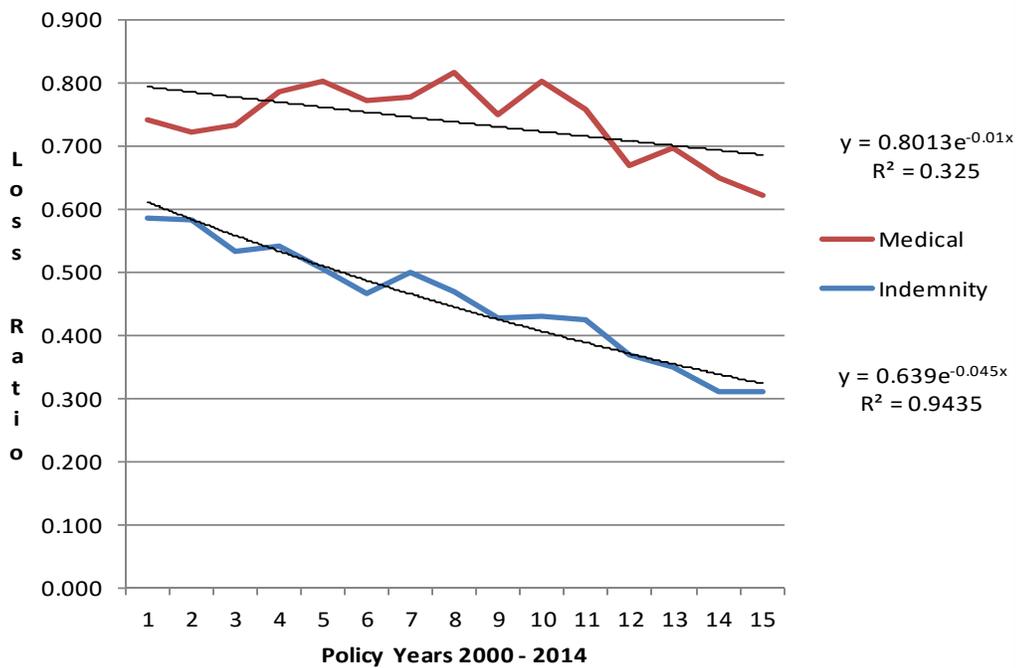
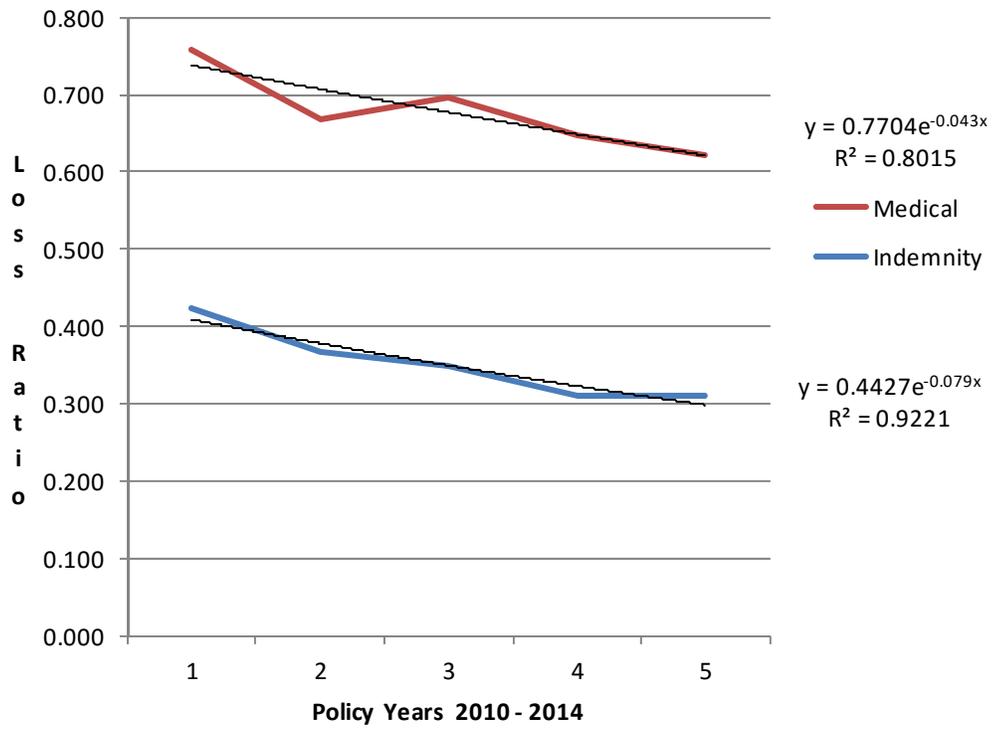


Figure 9

STATE OF TENNESSEE WORKERS COMPENSATION
5 Year Exponential Fit of Loss Ratio Trend Data



LOSS ADJUSTMENT EXPENSE

When comparing the accident year developed expense ratios in this filing to the ratios shown in previous filing, for the first time in ten years there are increases in some of the ratios. Last year's addition of tail factors to the development of both the DCCE-to-loss and AOE-to-loss ratios may have corrected the longstanding problem with the pattern of reductions to the ratios.

Under the assumption that the current estimates of ultimate ratios are more accurate than past estimates, BYNAC agrees with the selection of a three year average for DCCE due to the steady increase in ratios. BYNAC believes that the pattern for AOE is less clear and would select a five year average of 7.1%. BYNAC's recommendation would be to keep the LAE allowance at the same level as the current allowance (19.8%).

Table 12

**STATE OF TENNESSEE
WORKERS COMPENSATION**

LOSS ADJUSTMENT EXPENSE

<u>Accident Year</u>	<u>NCCI Countrywide AY Developed DCCE Ratio</u>	<u>NCCI Countrywide AY Developed AOE Ratio</u>	<u>NCCI Accident Year Developed LAE Ratio</u>
2006	10.5%	7.7%	18.2%
2007	10.5%	7.5%	18.0%
2008	11.0%	6.7%	17.7%
2009	11.2%	7.2%	18.4%
2010	11.6%	6.9%	18.5%
2011	12.2%	6.6%	18.8%
2012	13.0%	6.9%	19.9%
2013	13.0%	7.4%	20.4%
2014	13.5%	7.5%	21.0%
2015	13.2%	7.2%	20.4%
10 Year Average	12.0%	7.2%	19.1%
5 Year Average	13.0%	7.1%	20.1%
3 Year Average	13.2%	7.4%	20.6%
NCCI CW Selected	13.2%	7.4%	20.6%
NCCI TN Selected*	12.7%	7.4%	20.1%
BYNAC TN Selected*	12.7%	7.1%	19.8%
BYNAC Proposed Change in LAE Allowance			
Current Tennessee LAE Allowance			19.8%
BYNAC Proposed LAE Allowance			19.8%
Proposed Change in LAE			0.0%

* Reflects DCCE TN/CW relativity of 0.960.

QUALIFICATIONS AND LIMITATIONS

The estimates contained in this report depend upon the following:

- The actuarial assumptions, quantitative analysis, and professional judgment expressed in this report.
- The reliability of loss experience to serve as an indicator of future losses.
- The completeness and accuracy of data provided by NCCI.

Material changes in any of the assumptions or information upon which the findings are based will require a re-evaluation of the results of this report and a possible revision of those findings.

This report is intended for the use of the Tennessee Advisory Council on Workers'

Compensation. If the report is released to any third party, it should be released in its entirety.

Please advise BYNAC if this report is distributed to any other third party.

CONSULTATION

The professional opinion given in this report is based on the judgment and experience of BYNAC. An analysis by another actuary may not arrive at the same conclusion. In the event that another actuary is consulted regarding the findings of this report, both actuaries should make themselves available for supplemental advice and consultation.

TENNESSEE ADVISORY COUNCIL ON WORKERS' COMPENSATION

APPENDIX A

BYNAC RECOMMENDATIONS

Appendix A

**STATE OF TENNESSEE
WORKERS COMPENSATION**

INDICATED LOSS COST LEVEL CHANGE

Indicated Change Based on Experience, Trend, and Benefits:

	Policy Year		<u>NCCI</u>	<u>BYNAC</u>
	<u>2014</u>	<u>2013</u>		
Projected Indemnity Cost Ratio including Benefit Changes	0.270	0.256		
Projected Medical Cost Ratio including Benefit Changes	<u>0.599</u>	<u>0.616</u>		
Total Benefit Cost	0.869	0.872		
Selected			0.871	0.907

Offset Due to the Change in the Maximum Minimum Premium:

Offset			0.998	0.998
--------	--	--	-------	-------

Change in Loss Based Expenses:

Current Tennessee LAE Allowance			19.8%	19.8%
Proposed Tennessee LAE Allowance			20.1%	19.8%
Selected			1.003	1.000
Overall			-12.8%	-9.5%

TENNESSEE ADVISORY COUNCIL ON WORKERS' COMPENSATION

APPENDIX B

LARGE LOSS SUPPORTING DATA

Appendix B

**STATE OF TENNESSEE
WORKERS COMPENSATION**

CALL 31 LARGE LOSS DATA

Claim Counts and Paid + Case Losses For Claims Above \$500,000

Claim Counts

<u>Policy Year</u>	<u>1st Report</u>	<u>2nd Report</u>	<u>3rd Report</u>	<u>4th Report</u>	<u>5th Report</u>
2010	24	34	50	60	66
2011	23	30	42	48	
2012	29	30	32		
2013	26	32			
2014	31				

Paid + Case Losses

<u>Policy Year</u>	<u>1st Report</u>	<u>2nd Report</u>	<u>3rd Report</u>	<u>4th Report</u>	<u>5th Report</u>
2010	30,612,392	39,246,466	57,287,867	66,632,937	73,349,522
2011	18,347,009	24,348,426	32,145,151	38,832,976	
2012	34,300,328	37,436,318	42,770,044		
2013	42,174,228	38,187,573			
2014	35,013,361				