# PENNSYLVANIA COMPENSATION RATING BUREAU

# Indicated Change in Loss Costs

Page 1 presents the overall indicated change in loss costs.

For this filing, loss costs resulting from PCRB Filing No. C-377 were used to calculate expected losses on Page 1 and actual loss ratios on Page 2.

Derivation of the indemnity and medical trend factors and trended loss ratios shown on Page 1 is presented on Page 2. Severity ratios, defined as loss ratios adjusted by dividing out the frequency component, for both indemnity and medical, have been fitted using a seven-point exponential curve. Severity trend factors are calculated by fitting severity ratios to curves using a least squares regression analysis and comparing the fitted values at 4/1/22 to the fitted values at the midpoints of the latest three available policy years. Frequency trend factors are derived on Page 3. The resulting severity and frequency trend factors are then applied to the latest three available policy year loss ratios to generate projected ultimate trended loss ratios.

As described in Exhibit 8, staff has selected an annual frequency trend of -6.3%. Page 3 shows the derivation of overall frequency trend factors for each of the latest three available policy years.

### INDICATED CHANGE IN LOSS COSTS

		Indemnity	Medical	Total
(1)	Policy Year 2016 Ratio of Loss to Expected Loss	0.5585	0.5902	1.1487
(2)	Policy Year 2017 Ratio of Loss to Expected Loss	0.5526	0.5911	1.1437
(3)	Policy Year 2018 Ratio of Loss to Expected Loss	0.5553	0.6322	1.1875
(4)	Average (Midpoint = 1/1/2018)	0.5555	0.6045	1.1600
(5)	Policy Year 2016 Ratio Trended to 4/1/2022 +	0.4362	0.4830	0.9192
(6)	Policy Year 2017 Ratio Trended to 4/1/2022 +	0.4525	0.5026	0.9551
(7)	Policy Year 2018 Ratio Trended to 4/1/2022 +	0.4766	0.5584	1.0350
(8)	Average at 4/1/2022	0.4551	0.5147	0.9698
(9)	Indicated Change in Loss Costs	0.4551	0.5147	0.9698
(0)				-3.02%

# CHANGES IN MANUAL LOSS COST LEVEL BY INDUSTRY GROUP

		<u>Mfg.</u>	<u>Cont.</u>	<u>Other</u>	<u>Total</u>
(10) (11)	Current Collectible Premium Ratio Anticipated Collectible Premium Ratio	1.0427 1.0426	1.1287 1.1272	0.9928 0.9955	
(12)	Final Indicated Change in Manual Loss Cost Level (9T) * (11) / (10)	0.9697	0.9685	0.9724	0.9710

+ Refer to pages 1.2 and 1.3

#### **DETERMINATION OF TREND**

				INDEMNITY				
Policy Year		2012	2013	2014	2015	2016	2017	2018
Actual Loss Ratio		0.7001	0.6927	0.6621	0.5996	0.5585	0.5526	0.5553
Normalized Frequency		0.8396	0.8224	0.7513	0.6936	0.6491	0.6139	0.5863
Severity Loss Ratio		0.8338	0.8423	0.8812	0.8645	0.8604	0.9001	0.9471
	x	1	2	3	4	5	6	7
	<u>x</u> y	0.8338	0.8423	0.8812	0.8645	0.8604	0.9001	0.9471
	7 Poin	t Exponential R	egression: y :	= 0.815637 * 1.01	7693 ^ x			
	Select	ed Annual Seve	rity Trend Fa	ctor =			1.77%	]
		Annual		Trend Period				
Policy		Severity		# of Years		Severity		Frequency
Year		Trend Factor		to 4/1/22		Trend Factor		Trend Factor
		(1)		(2)		$(3) = (1)^{(2)}$		(4) #
				~ /				~ /
2016		1.0177		5.2500		1.0965		0.7124
2017		1.0177		4.2500		1.0774		0.7600
2018		1.0177		3.2500		1.0587		0.8107
Trended Loss Ratio								
Policy		Actual		Combined		Trended		
Year		Loss Ratio		Trend Factor		Loss Ratio		
i cai		(5)		(6) = (3) * (4)		(7) = (5) * (6)		
		(0)				(1) (0) (0)		
2016		0.5585		0.7811		0.4362		
2017		0.5526		0.8188		0.4525		
2018		0.5553		0.8583		0.4766		
Policy Year		2012	2013	MEDICAL 2014	2015	2016	2017	2018
Actual Loss Ratio		0.7318	0.7356	0.7157	0.6199	0.5902	0.5911	0.6322
Normalized Frequency Severity Loss Ratio		0.8396 0.8716	0.8224 0.8945	0.7513 0.9526	0.6936 0.8938	0.6491 0.9093	0.6139 0.9628	0.5863 1.0783
Seventy Loss Malo		0.0710	0.0343	0.3320	0.0350	0.3035	0.9020	1.0705
	х	1	2	3	4	5	6	7
	У	0.8716	0.8945	0.9526	0.8938	0.9093	0.9628	1.0783
	7 Poin	t Exponential R	egression: y :	= 0.841687 * 1.02	26747 ^ x			
	Selected Annual Severity Trend Factor =							1
	Select	ed Annual Seve	rity Trend Fac	ctor =			2.67%	1
	Select		rity Trend Fa				2.67%	1
Policy	Select	Annual	rity Trend Fa	Trend Period		Severity	2.67%	
Policy Year	Select	Annual Severity	rity Trend Fa			Severity Trend Factor	2.67%	Frequency
	Select	Annual	rity Trend Fa	Trend Period # of Years		Severity Trend Factor (3) = (1) ^ (2)	2.67%	
Year	Select	Annual Severity Trend Factor (1)	rity Trend Fa	Trend Period # of Years to 4/1/22 (2)		Trend Factor $(3) = (1)^{(2)}$	2.67%	Frequency Trend Factor (4) #
Year 2016	Select	Annual Severity Trend Factor (1) 1.0267	rity Trend Fa	Trend Period # of Years to 4/1/22 (2) 5.2500		Trend Factor (3) = (1) ^ (2) 1.1486	2.67%	Frequency Trend Factor (4) # 0.7124
Year 2016 2017	Select	Annual Severity Trend Factor (1) 1.0267 1.0267	rity Trend Fa	Trend Period # of Years to 4/1/22 (2) 5.2500 4.2500		Trend Factor (3) = (1) ^ (2) 1.1486 1.1187	2.67%	Frequency Trend Factor (4) # 0.7124 0.7600
Year 2016	Select	Annual Severity Trend Factor (1) 1.0267	rity Trend Fa	Trend Period # of Years to 4/1/22 (2) 5.2500		Trend Factor (3) = (1) ^ (2) 1.1486	2.67%	Frequency Trend Factor (4) # 0.7124
Year 2016 2017	Select	Annual Severity Trend Factor (1) 1.0267 1.0267	rity Trend Fa	Trend Period # of Years to 4/1/22 (2) 5.2500 4.2500		Trend Factor (3) = (1) ^ (2) 1.1486 1.1187	2.67%	Frequency Trend Factor (4) # 0.7124 0.7600
Year 2016 2017 2018	Select	Annual Severity Trend Factor (1) 1.0267 1.0267	rity Trend Fad	Trend Period # of Years to 4/1/22 (2) 5.2500 4.2500	Combined	Trend Factor (3) = (1) ^ (2) 1.1486 1.1187	Ţrended	Frequency Trend Factor (4) # 0.7124 0.7600
Year 2016 2017 2018 Trended Loss Ratio	Select	Annual Severity Trend Factor (1) 1.0267 1.0267		Trend Period # of Years to 4/1/22 (2) 5.2500 4.2500	Combined Trend Factor	Trend Factor (3) = (1) ^ (2) 1.1486 1.1187		Frequency Trend Factor (4) # 0.7124 0.7600
Year 2016 2017 2018 Trended Loss Ratio Policy	Select	Annual Severity Trend Factor (1) 1.0267 1.0267	Actual	Trend Period # of Years to 4/1/22 (2) 5.2500 4.2500		Trend Factor (3) = (1) ^ (2) 1.1486 1.1187	Trended	Frequency Trend Factor (4) # 0.7124 0.7600
Year 2016 2017 2018 <b>Trended Loss Ratio</b> Policy Year	Select	Annual Severity Trend Factor (1) 1.0267 1.0267	Actual Loss Ratio (5)	Trend Period # of Years to 4/1/22 (2) 5.2500 4.2500	Trend Factor $(6) = (3) * (4)$	Trend Factor (3) = (1) ^ (2) 1.1486 1.1187	Trended Loss Ratio (7) = (5) * (6)	Frequency Trend Factor (4) # 0.7124 0.7600
Year 2016 2017 2018 Trended Loss Ratio Policy Year 2016	Select	Annual Severity Trend Factor (1) 1.0267 1.0267	Actual Loss Ratio (5) 0.5902	Trend Period # of Years to 4/1/22 (2) 5.2500 4.2500	Trend Factor (6) = (3) * (4) 0.8183	Trend Factor (3) = (1) ^ (2) 1.1486 1.1187	Trended Loss Ratio (7) = (5) * (6) 0.4830	Frequency Trend Factor (4) # 0.7124 0.7600
Year 2016 2017 2018 <b>Trended Loss Ratio</b> Policy Year	Select	Annual Severity Trend Factor (1) 1.0267 1.0267	Actual Loss Ratio (5)	Trend Period # of Years to 4/1/22 (2) 5.2500 4.2500	Trend Factor $(6) = (3) * (4)$	Trend Factor (3) = (1) ^ (2) 1.1486 1.1187	Trended Loss Ratio (7) = (5) * (6)	Frequency Trend Factor (4) # 0.7124 0.7600

### **DETERMINATION OF TREND**

#### **CLAIM FREQUENCY**

Policy Year Frequency per \$1 million of Expected Losses {1 = PY 2008, 12 = PY 2018}

	Policy		Claim		Normalized		
	Year		Frequency		Frequency		
	2008		27.87		1.0000		
	2009		27.18		0.9752		
	2010		26.66		0.9566		
	2011		24.97		0.8959		
	2012		23.40		0.8396		
	2013		22.92		0.8224		
	2014		20.94		0.7513		
	2015		19.33		0.6936		
	2016		18.09		0.6491		
	2017		17.11		0.6139		
	2018		16.34		0.5863		
Policy Year	2012	2013	2014	2015	2016	2017	2018
x	1	2	3	4	5	6	7
У	0.8396	0.8224	0.7513	0.6936	0.6491	0.6139	0.5863

### 7 Point Exponential Regression: y = 0.909010 \* 0.937457 ^ x

# Selected Annual Frequency Trend Factor =

Policy Year	Annual Frequency Trend Factor (1)	Trend Period # of Years to 4/1/22 (2)	Frequency Trend Factor (3) = (1) ^ (2)
2016	0.9375	5.2500	0.7124
2017	0.9375	4.2500	0.7600
2018	0.9375	3.2500	0.8107