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WCIRB Actuarial Committee Meeting

March 21, 2022

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01

Impact of Economic Slowdown on Pure Premium Rate Indications

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Impact of the Economic Slowdown on Pure Premium Rate Indications

- The magnitude and speed of recent economic changes is unprecedented
  - Virtually all industries have been affected
    - Employment changes by industry vary substantially
    - Recent changes in the industrial mix and wage level distribution have had large and atypical impacts

- For pure premium ratemaking, changes due solely to changing industrial mix should be excluded from projections

- WCIRB staff has estimated impacts of changing industrial mix and other factors for:
  - Claim Severity
  - Claim Frequency
  - Average Wage

Industry Mix

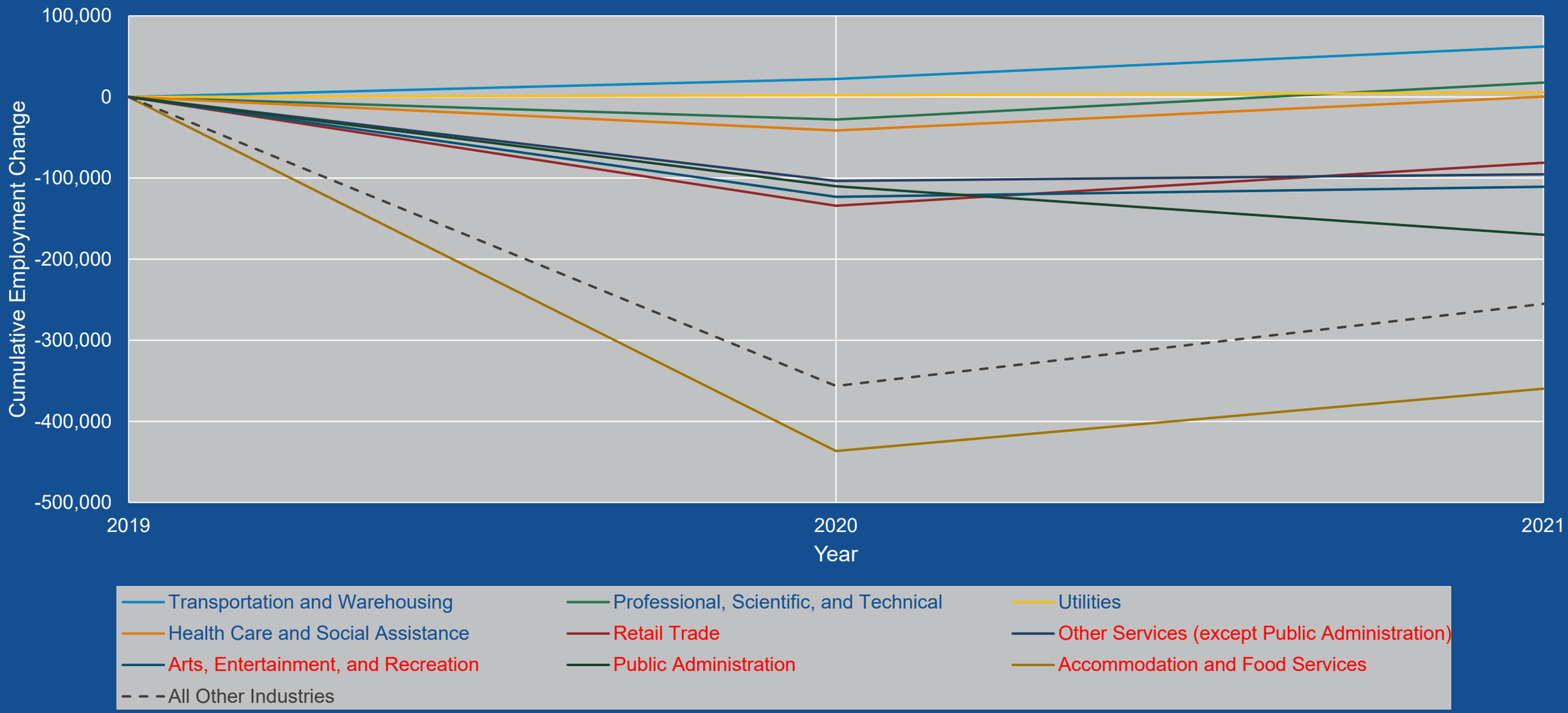
- Changes in industry mix often have direct and measurable impacts on claims cost measures
- Recent mix changes during the economic downturn and recovery have been very significant
- Levels of employment by industry have changed substantially over the last two years
  - Forecasts of employment levels have been volatile as well

Cumulative Change in Employment from 2019

Industry	Cumulative Change in Employment from 2019					
	2019	2020	2021	2022	2023	2024
Utilities	56,477	3.6%	9.8%	13.9%	16.5%	19.4%
Transportation and Warehousing	647,439	3.4%	9.6%	13.7%	16.3%	19.2%
Information	562,658	-6.1%	-3.5%	2.1%	8.7%	12.9%
Professional, Scientific, and Technical	1,332,194	-2.1%	1.3%	6.8%	11.1%	12.5%
Management of Companies and Enterprises	255,718	-4.6%	-1.3%	4.0%	8.2%	9.6%
Health Care and Social Assistance	2,424,985	-1.7%	0.0%	3.4%	5.5%	7.0%
Admin, Support, Waste Mgmt/Remediation	1,134,080	-7.6%	-4.3%	0.8%	4.9%	6.2%
Construction	885,742	-3.5%	-0.3%	1.8%	3.5%	5.4%
Finance and Insurance	538,987	-0.6%	-1.3%	0.7%	2.5%	3.9%
Other Services (except Public Administration)	576,533	-18.0%	-16.5%	-8.2%	-2.3%	2.4%
Public Administration	2,596,933	-4.2%	-6.5%	-3.9%	-0.7%	0.9%
Agriculture, Forestry, Fishing and Hunting	422,558	-3.6%	-0.4%	-0.1%	0.0%	0.2%
Accommodation and Food Services	1,706,570	-25.6%	-21.1%	-7.0%	-3.2%	0.1%
Educational Services	383,240	-9.2%	-7.6%	-4.5%	-2.5%	-1.2%
Manufacturing	1,326,892	-4.9%	-5.1%	-2.9%	-1.7%	-1.6%
Wholesale Trade	691,867	-7.0%	-6.8%	-5.2%	-3.6%	-2.8%
Real Estate and Rental and Leasing	302,405	-7.3%	-8.0%	-6.1%	-4.4%	-3.2%
Retail Trade	1,657,267	-8.1%	-4.9%	-4.8%	-6.3%	-8.4%
Mining	22,467	-11.9%	-16.1%	-14.8%	-13.4%	-10.1%
Arts, Entertainment, and Recreation	329,813	-37.3%	-33.5%	-21.7%	-18.5%	-15.7%
All Industries	17,854,825	-7.3%	-5.5%	-1.2%	1.4%	2.8%

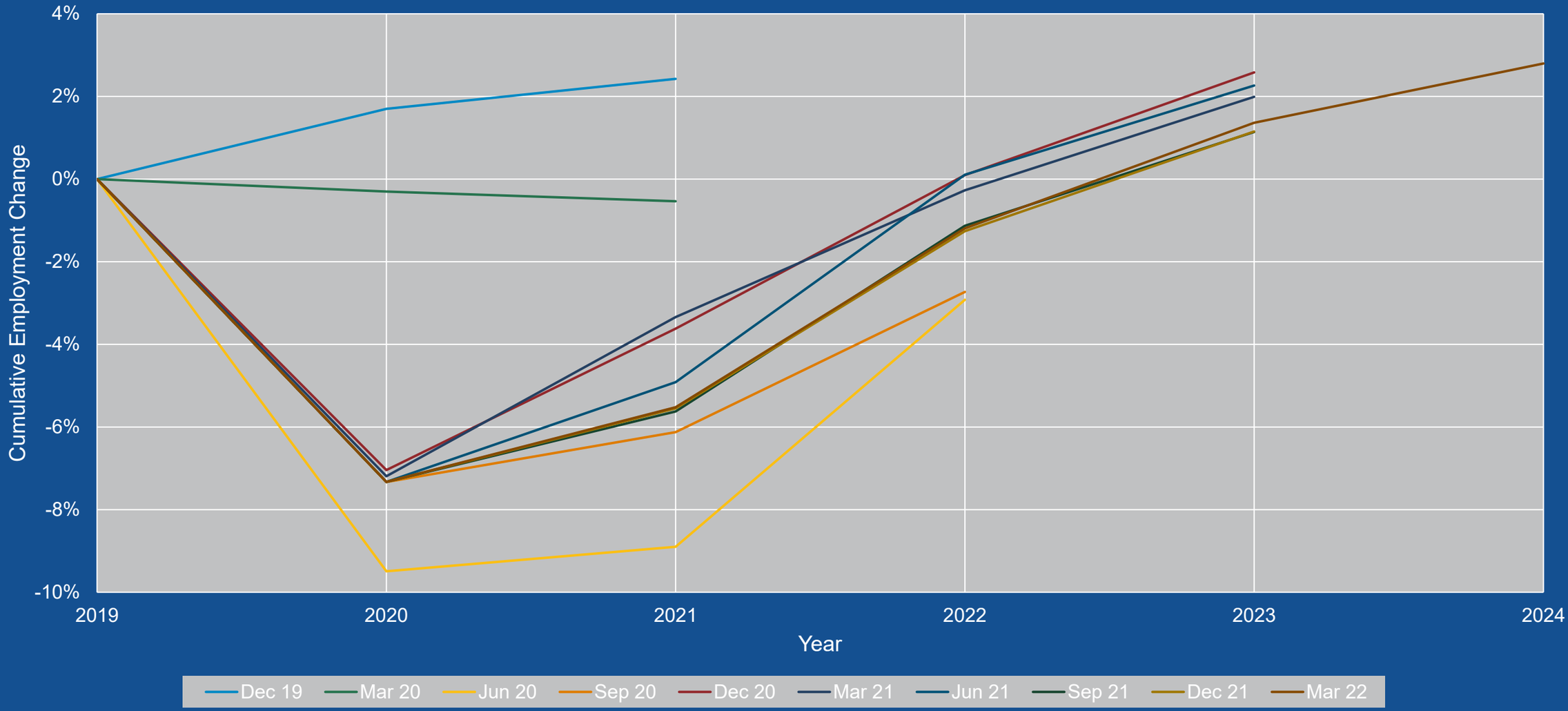
Source: March 2022 UCLA Forecast

Change in Employment (Select Industries): 2019-2021



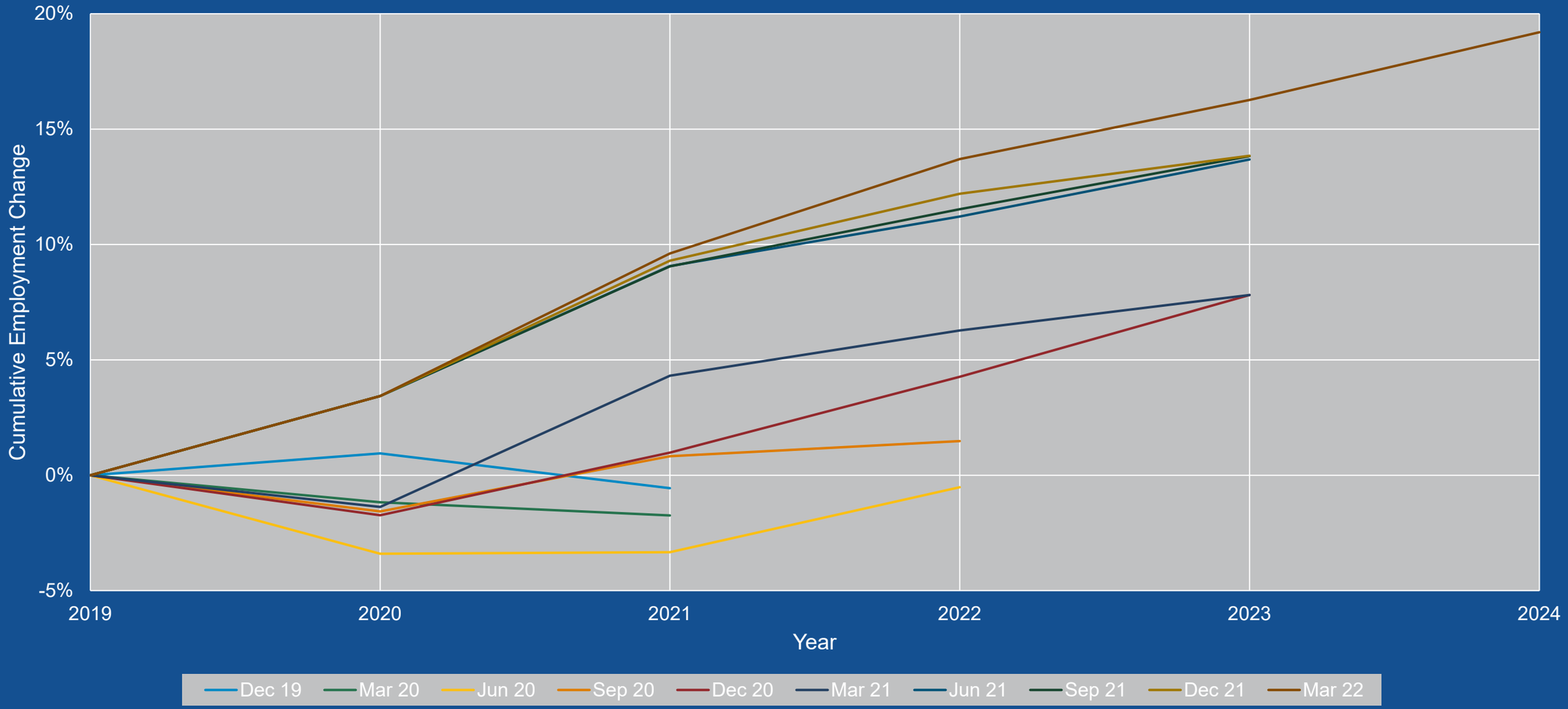
Source: March 2022 UCLA Forecast

Cumulative Employment Change by Forecast
All Industries



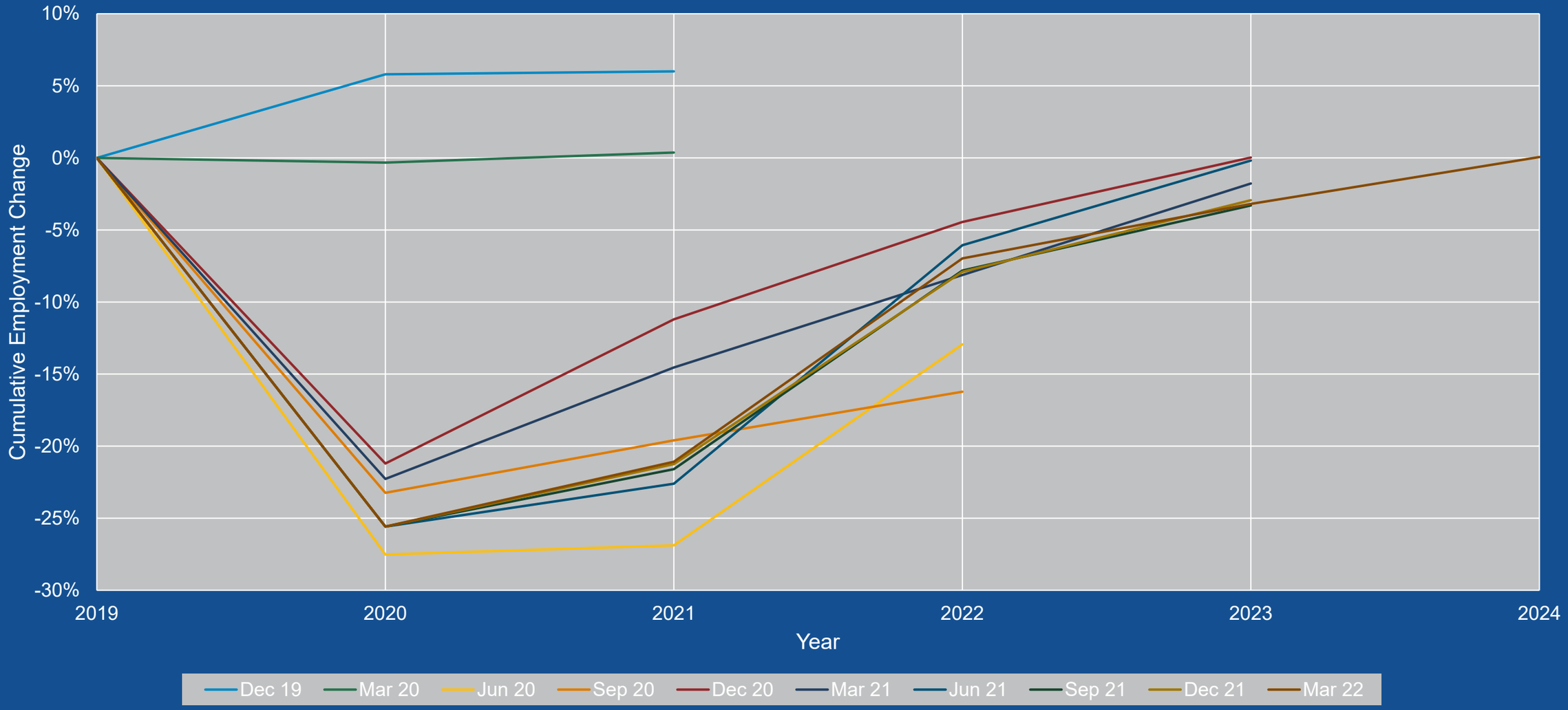
Source: December 2019 through March 2022 UCLA Forecasts

Cumulative Employment Change by Forecast
Transportation & Warehousing



Source: December 2019 through March 2022 UCLA Forecasts

Cumulative Employment Change by Forecast
Accommodation & Food Services



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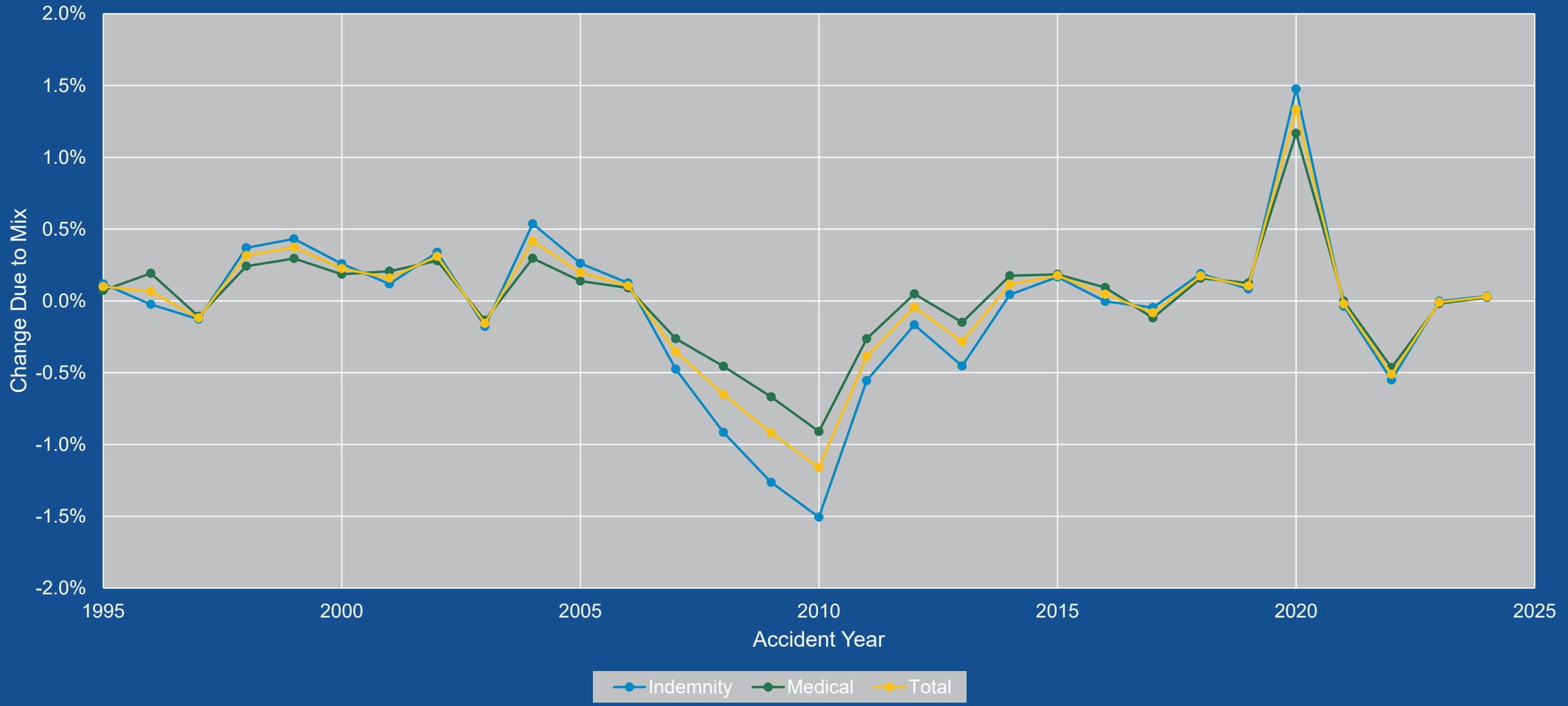
Source: December 2019 through March 2022 UCLA Forecasts

Claim Severity

- WCIRB has developed estimates of changes in claim severity due to industrial mix
- Estimates are based on USR data, where available
- For future years, historic industry severity relativities are used and count distributions are adjusted using forecasts of employment changes
  - This method implicitly assumes that industry frequency and severity relativities will continue

- These adjustments, if used, would be applied to historic years used to select severity trends

Change in Severity Due to Industrial Mix



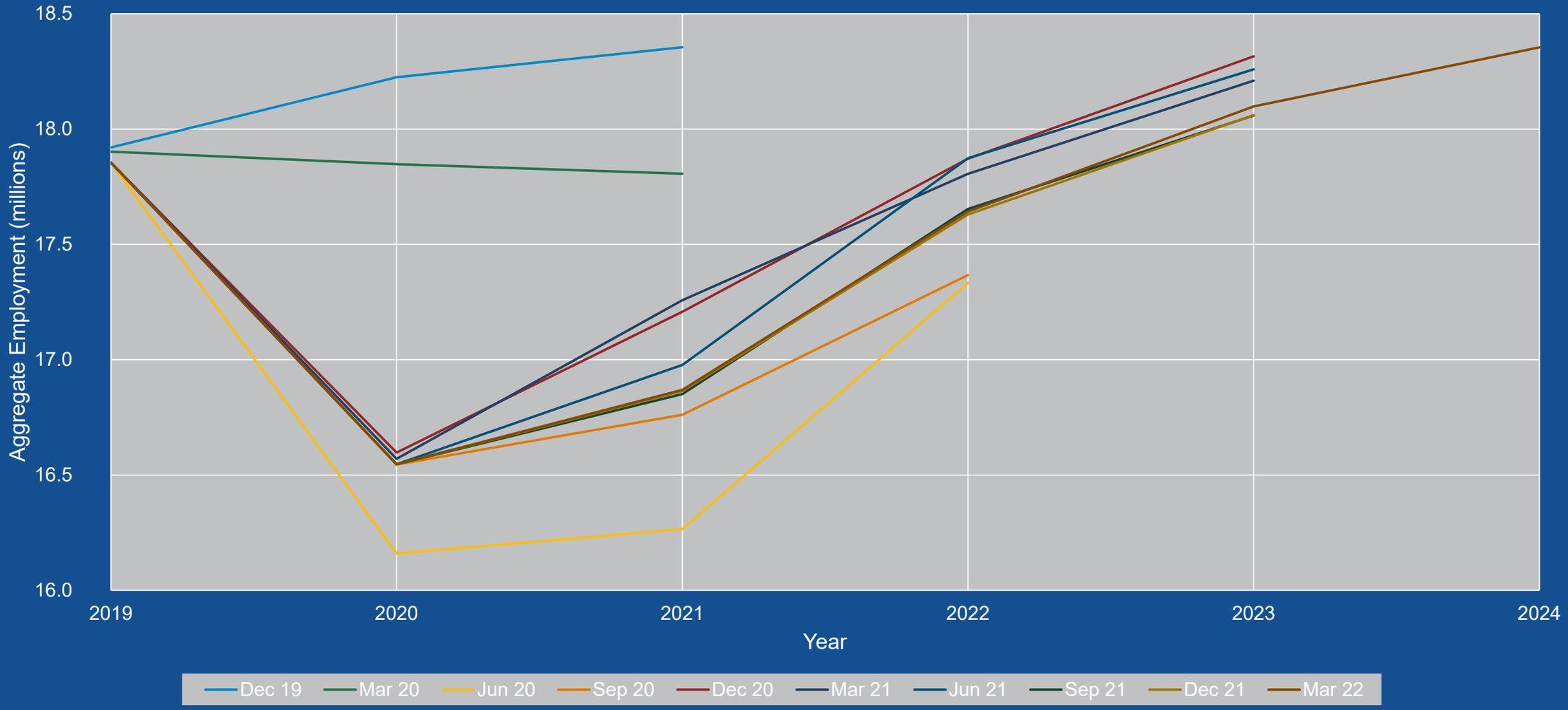
Source: UCLA Anderson Forecast and USR Data

Claim Frequency

- The WCIRB frequency model predicts frequency changes that are adjusted for industrial mix
  - No separate adjustment is required

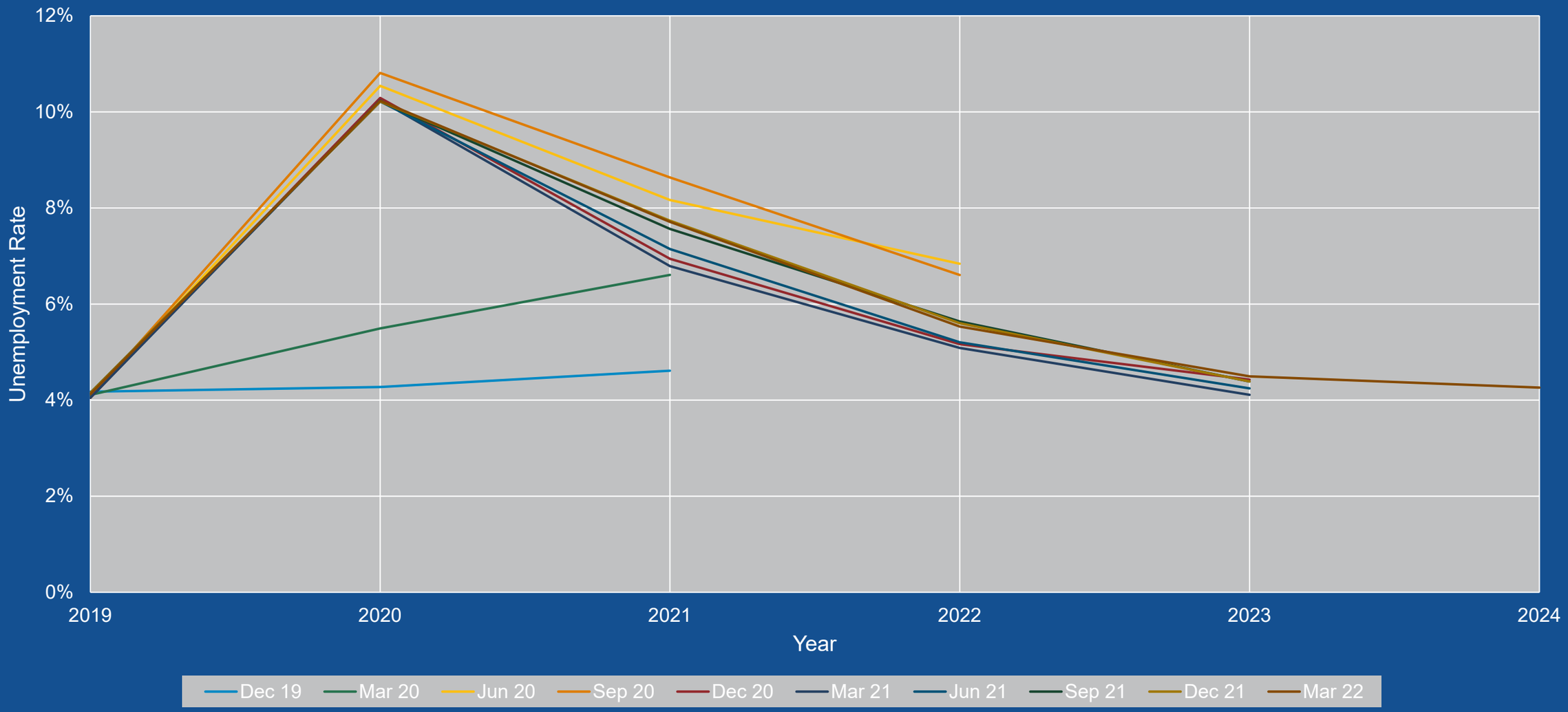
- Model predicted frequency changes are dependent on changes in economic conditions
  - Economic Variables - First principal component decomposition of:
    - Changes in unemployment rate
    - Changes in aggregate employment

Aggregate Employment by Forecast



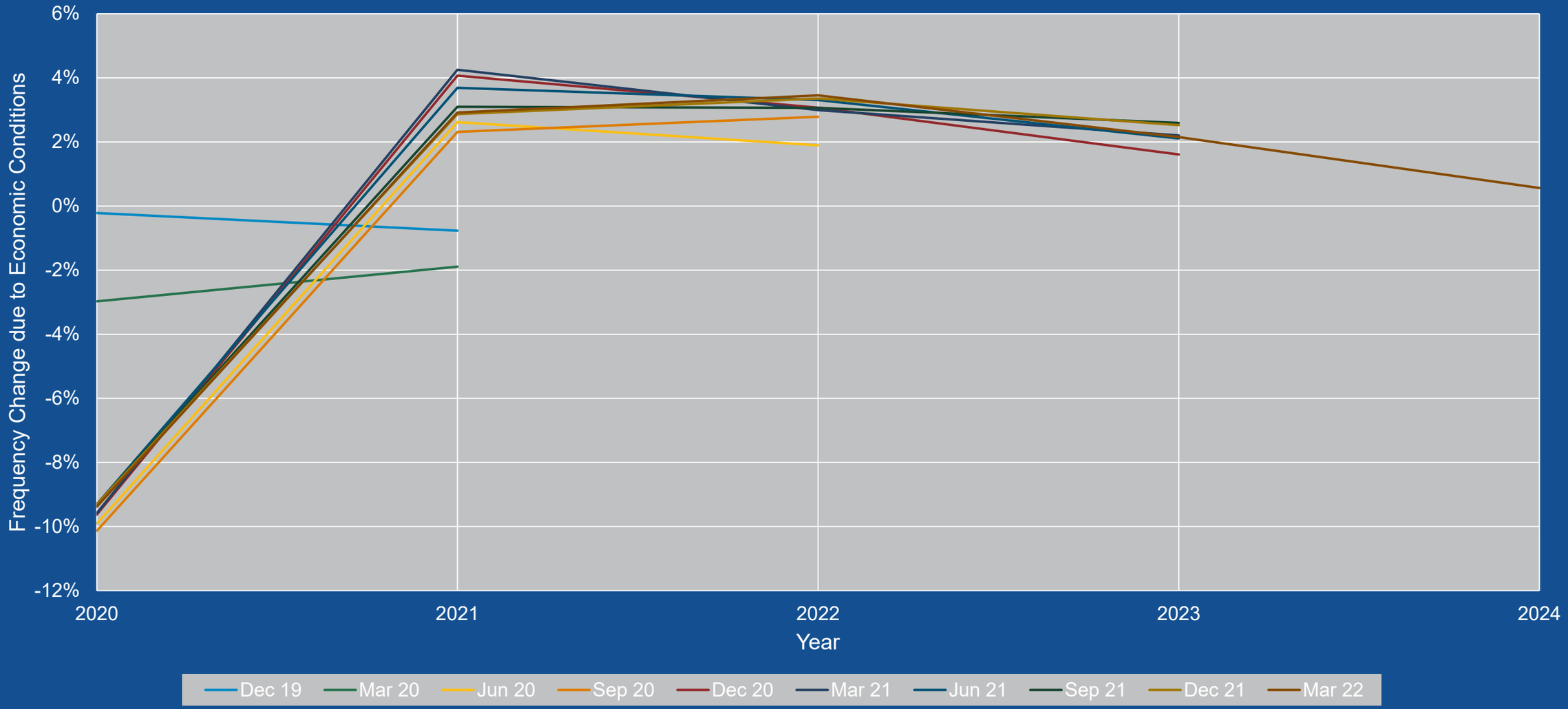
Source: December 2019 through March 2022 UCLA Forecasts

Unemployment Rate by Forecast



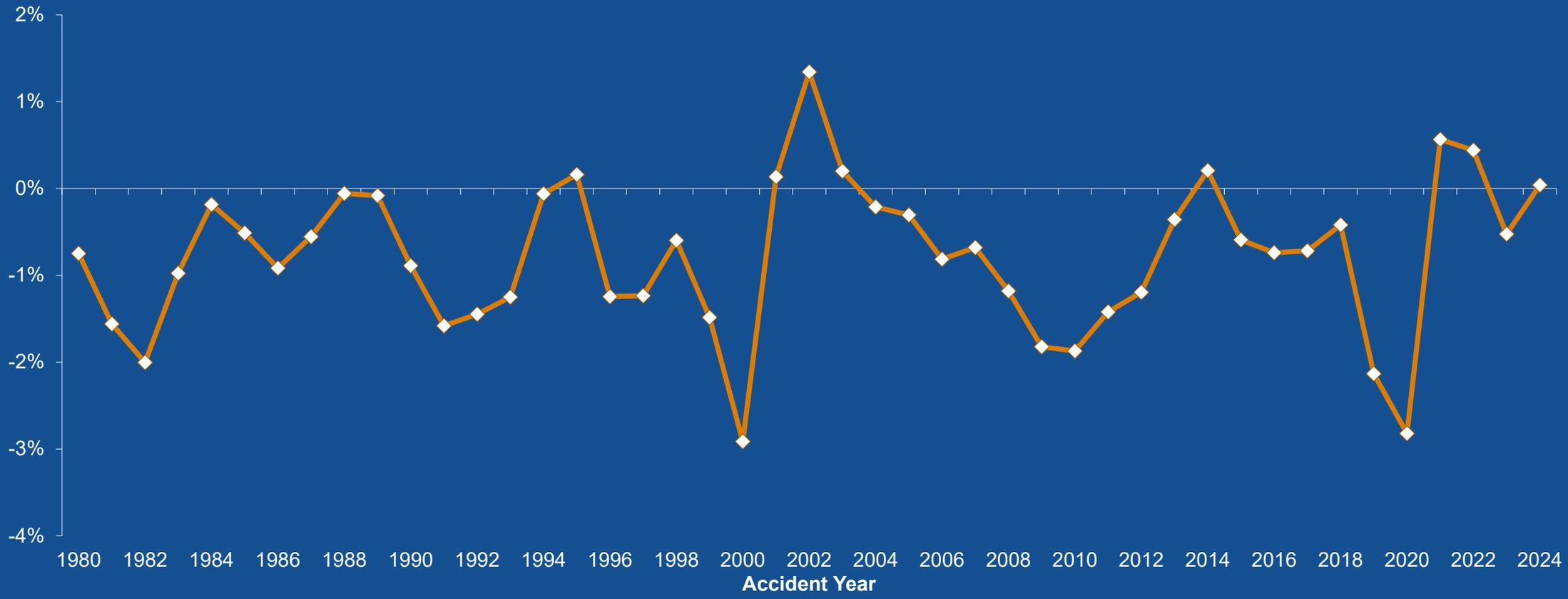
Source: December 2019 through March 2022 UCLA Forecasts

Modeled Frequency Change due to Economic Conditions by Forecast



Source: December 2019 through March 2022 UCLA Forecasts

Change in Frequency Due to Industrial Mix



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Source: UCLA Anderson Forecast and WCIRB Frequency Model

Average Wage

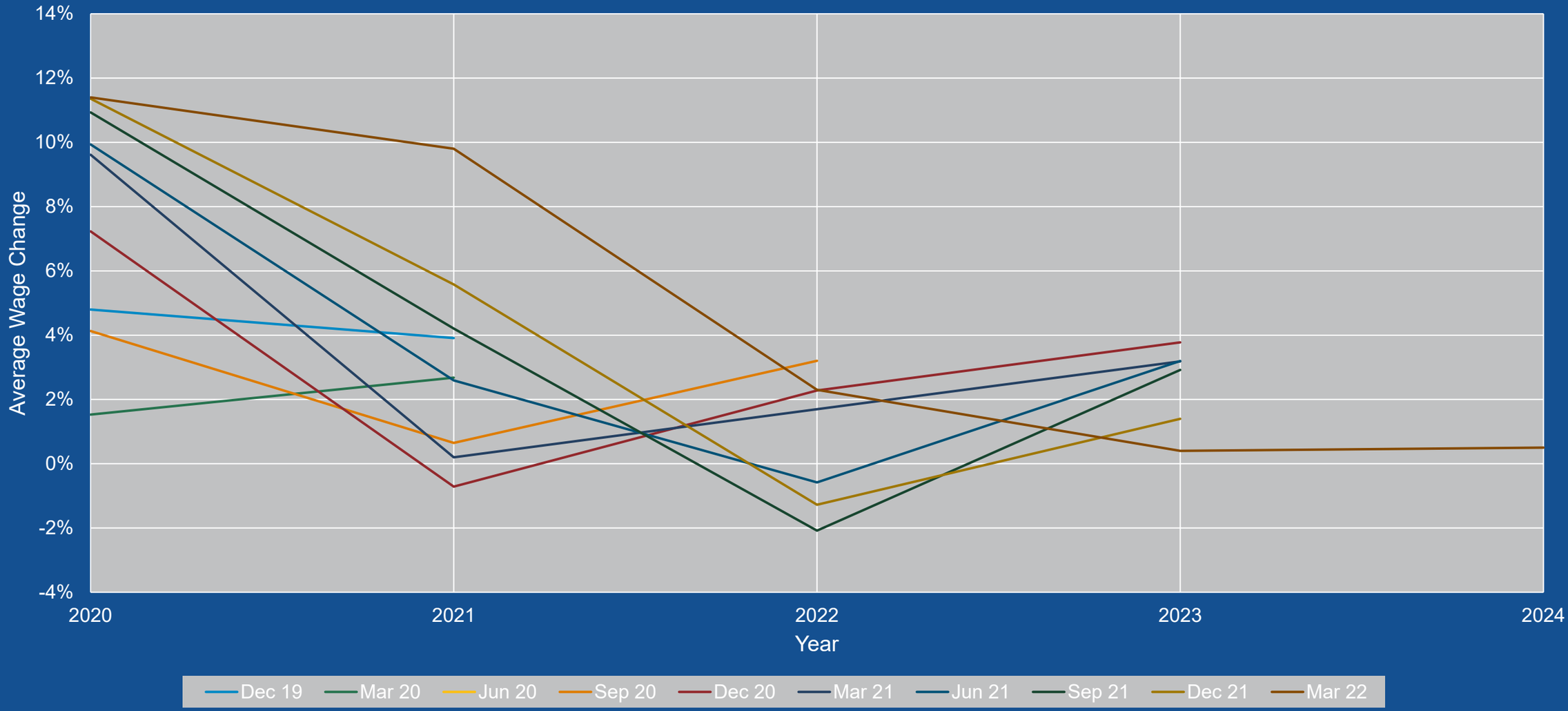
- Current forecasts of average wage changes are from March 2022 UCLA and November 2021 Department of Finance

- The averages of these wage forecasts are:

Source	2020	2021	2022	2023	2024
Average	11.4%	8.0%	2.8%	2.0%	2.1%
UCLA	11.4%	9.8%	2.3%	0.4%	0.5%
DoF		6.1%	3.2%	3.6%	3.6%

- Forecasts and early historic estimates of these changes have been very volatile
- 2020 and 2021 change in average wage not likely indicative of the wage increase of the typical worker in the same job

Annual Change in Average Wage by Forecast - UCLA



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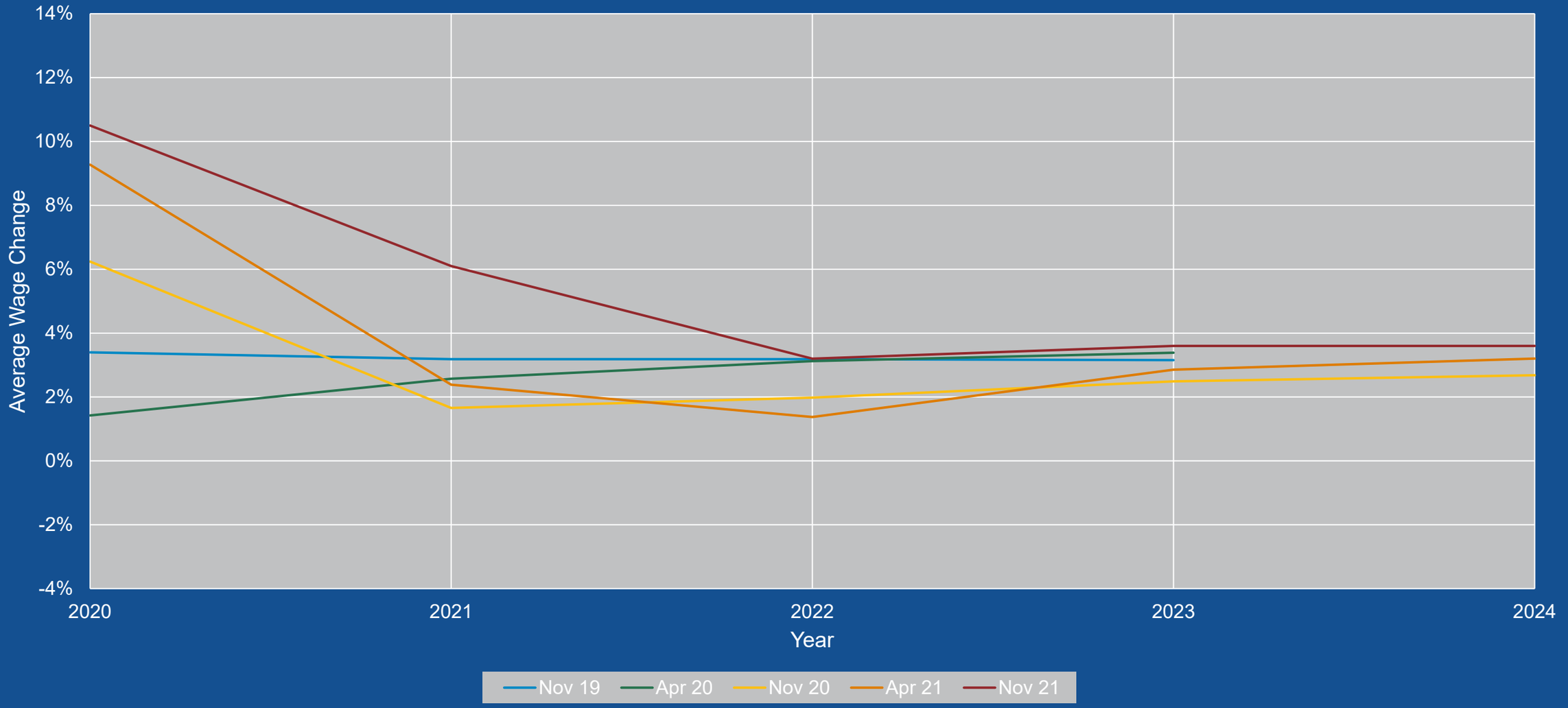
Source: December 2019 through March 2022 UCLA Forecasts

Annual Change in Average Wage by Forecast – Department of Finance



Source: December 2019 through March 2022 UCLA Forecasts

Mix Adjustments

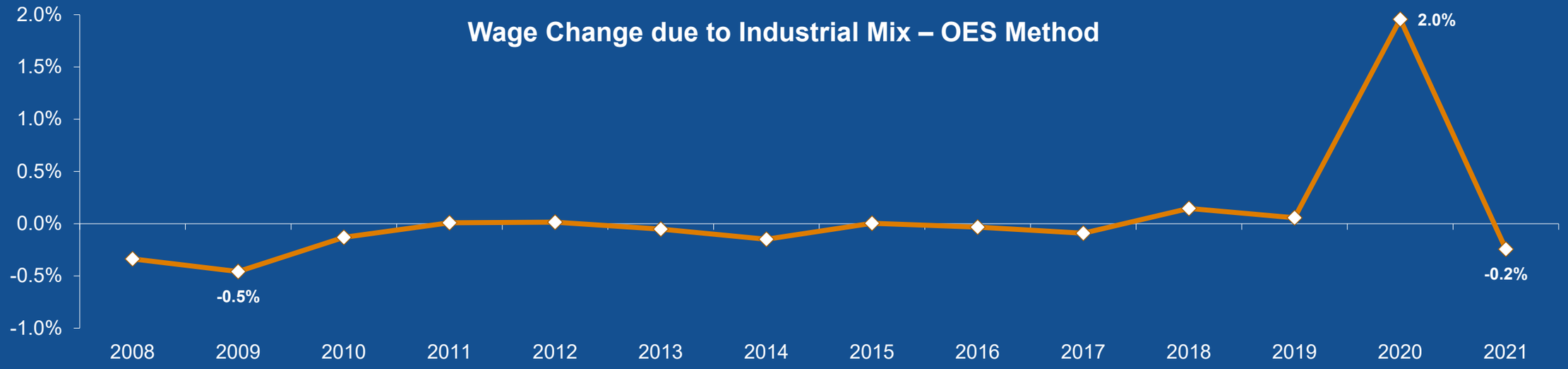
- Staff has developed two estimates of the impact of changing industrial mix on wage changes
  1) Based on BLS OES data through year end 2021
  2) Based on BLS QCEW wage data through 2020 and UCLA employment forecasts

- 2020 and, to a lesser extent, 2021 estimates artificially high due to uneven distribution of job losses by wage level
- 2022 - 2024 estimates lowered by projected partial reversals of these impacts

- Staff has developed two estimates of the impact of changing industrial mix on wage changes
  1) Based on BLS OES data through year end 2021
  2) Based on BLS QCEW wage data through 2020 and UCLA employment forecasts

Industrial Mix Impact on Average Wage – OES Method

- This estimate is a reasonableness check of the QCEW/UCLA Method
  - This data set excludes agricultural and government employees
  - Forecasts are not available



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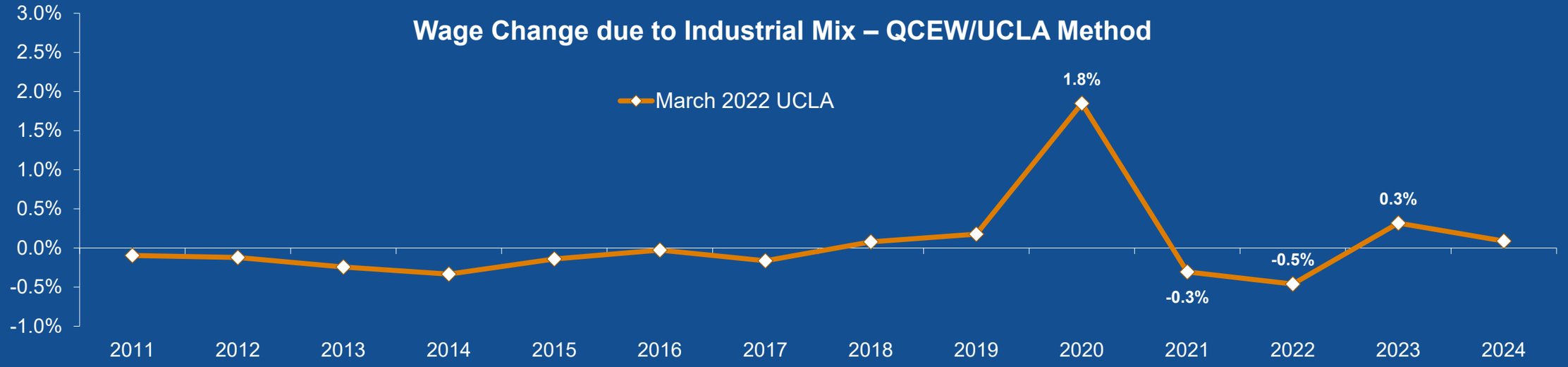
Source: Bureau of Labor Statistics Occupational Employment Statistics

Industrial Mix Impact on Average Wage – QCEW/UCLA Method

- This estimate uses observed industrial wage relativities from QCEW data through 2019
- These relativities are extended into the future with industrial mix determined by UCLA forecasts



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Source: Bureau of Labor Statistics Quarterly Census of Employment and Wages and UCLA Anderson Forecasts (March and June 2020)

2020 Wage Level Mix Adjustment – Data Sources and Methodology

- Data Sources
  - March 2022 UCLA forecast: Distribution of employment by industry and employment change by industry
  - ACS data sets: Distributions of wage level within industries
    - California data
    - Annual values are adjusted for reported weeks and hours worked
  - Industrial sectors with sparse data are combined with other sectors

- Two main elements of the adjustment
  - Measurement of wage mix impact in 2020
    - Observed 2019 average wage by industry is compared to a mix-adjusted 2020 average wage
    - Mix-adjusted wage uses:
      - 2019 industrial mix
      - 2019 average wages by industry and wage quartile
      - 2020 distribution of employees by wage quartile within industry
- This method is analogous to the adjustment made in the 9/1/2021 filing
  - The only difference is the use of the less volatile recently available ACS data to determine wage levels
  - The estimate using ACS data is very similar to last year's estimate using CPS data

Derivation of ACS Average Wage at 2019 Levels

	B	C				D				E
	2019 Industry Distribution	2019 ACS Quartile Distribution				2019 ACS Average Wage by Quartile				
		1	2	3	4	1	2	3	4	Total
Agriculture & Mining	2.5%	44.6%	34.2%	13.1%	8.1%	9.86	17.74	30.19	75.34	20.53
Utilities & Construction	5.3%	17.6%	25.4%	33.1%	23.9%	9.77	18.31	31.43	69.58	33.39
Manufacturing	7.4%	18.7%	24.8%	25.7%	30.8%	10.21	18.40	31.42	83.07	40.14
Wholesale	3.9%	21.2%	27.9%	28.1%	22.8%	10.22	18.41	31.09	84.06	35.22
Retail	9.3%	38.9%	30.1%	18.7%	12.4%	9.88	18.03	30.32	86.24	25.62
Transportation & Warehousing	3.6%	26.2%	30.3%	30.1%	13.4%	9.86	18.24	31.07	74.58	27.45
Information	3.2%	9.9%	13.9%	27.8%	48.4%	9.29	18.84	32.43	98.51	60.21
Finance & Insurance	3.0%	9.4%	19.6%	30.5%	40.4%	9.56	18.64	31.81	94.16	52.31
Real Estate	1.7%	19.1%	24.7%	27.5%	28.8%	9.01	18.42	31.34	97.90	43.02
Prof. Services & Mgmt. of Companies	8.9%	8.2%	13.0%	26.6%	52.2%	9.22	18.56	32.52	88.51	58.01
Administrative	6.4%	36.6%	30.5%	21.8%	11.2%	9.91	18.05	30.71	77.15	24.45
Education	2.1%	17.2%	23.1%	34.6%	25.1%	9.48	18.73	31.91	63.83	33.02
Health	13.6%	21.4%	26.6%	26.5%	25.4%	9.83	18.27	31.27	83.25	36.43
Arts & Entertainment	1.8%	30.5%	29.4%	24.1%	16.0%	9.08	18.19	30.84	88.64	29.70
Hospitality	9.6%	51.9%	29.9%	13.4%	4.8%	9.47	17.91	29.67	78.94	18.05
Other	3.2%	35.5%	31.3%	22.5%	10.6%	9.24	18.10	30.83	71.27	23.47
Public Administration	14.5%	15.0%	19.7%	33.2%	32.2%	9.44	18.91	32.20	61.67	35.66
All Industries	100.0%	24.9%	24.9%	25.5%	24.6%	9.68	18.29	31.44	80.35	34.79

Sample Column E Calculations

Hospitality: 18.05 = ∑(C x D) = 51.9% x 9.47 + 29.9% x 17.91 + 13.4% x 29.67 + 4.8% x 78.94

All Industries: 34.79 = ∑(B x E)

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Source: March 2022 UCLA Forecast (Column B); 2019 ACS Data Set (Columns C and D)

Derivation of 2020 Wage-Mix Adjusted Average Wage

	B	F				D				G
	2019 Industry	2020 ACS Quartile Distribution				2019 ACS Average Wage by Quartile				
	Distribution	1	2	3	4	1	2	3	4	Total
Agriculture & Mining	2.5%	44.8%	30.9%	16.0%	8.4%	9.86	17.74	30.19	75.34	21.02
Utilities & Construction	5.3%	14.0%	26.7%	31.9%	27.5%	9.77	18.31	31.43	69.58	35.40
Manufacturing	7.4%	16.9%	24.5%	25.9%	32.7%	10.21	18.40	31.42	83.07	41.51
Wholesale	3.9%	20.1%	28.6%	28.0%	23.3%	10.22	18.41	31.09	84.06	35.62
Retail	9.3%	35.4%	31.4%	20.1%	13.1%	9.88	18.03	30.32	86.24	26.54
Transportation & Warehousing	3.6%	24.0%	32.4%	30.0%	13.6%	9.86	18.24	31.07	74.58	27.74
Information	3.2%	9.4%	11.0%	26.1%	53.5%	9.29	18.84	32.43	98.51	64.15
Finance & Insurance	3.0%	8.2%	19.3%	29.3%	43.2%	9.56	18.64	31.81	94.16	54.37
Real Estate	1.7%	16.8%	24.9%	31.1%	27.2%	9.01	18.42	31.34	97.90	42.45
Prof. Services & Mgmt. of Companies	8.9%	7.1%	12.0%	26.2%	54.6%	9.22	18.56	32.52	88.51	59.76
Administrative	6.4%	33.5%	31.0%	22.5%	13.0%	9.91	18.05	30.71	77.15	25.87
Education	2.1%	14.9%	21.7%	35.9%	27.5%	9.48	18.73	31.91	63.83	34.47
Health	13.6%	19.6%	26.3%	26.8%	27.3%	9.83	18.27	31.27	83.25	37.88
Arts & Entertainment	1.8%	28.2%	25.7%	27.9%	18.2%	9.08	18.19	30.84	88.64	31.98
Hospitality	9.6%	48.2%	30.0%	15.7%	6.1%	9.47	17.91	29.67	78.94	19.39
Other	3.2%	33.1%	31.1%	24.3%	11.4%	9.24	18.10	30.83	71.27	24.35
Public Administration	14.5%	14.1%	17.7%	33.9%	34.3%	9.44	18.91	32.20	61.67	36.74
All Industries	100.0%	22.9%	24.5%	26.2%	26.4%	9.68	18.28	31.41	80.26	36.13

Sample Column G Calculations

Hospitality: 19.39 = ∑(F x D) = 48.2% x 9.47 + 30.0% x 17.91 + 15.7% x 29.67 + 6.1% x 78.94

All Industries: 36.13 = ∑(B x J)

Estimated Impact

36.13 / 34.79 – 1 = 3.9%

Note: 4.3% using CPS wage data

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Source: March 2022 UCLA Forecast (Column B); 2020 ACS Data (Column F); 2019 ACS Data (Column D)

2021 Wage Level Mix Adjustment – Data Sources and Methodology

- Given the large wage increase in 2021 and the vetting of this method using ACS data, staff recommends using this method to adjust the 2021 wage change
- Data Sources
  - March 2022 UCLA forecast: Distribution of employment by industry and employment change by industry
  - EPI CPS data sets: Distributions of wage level within industries
    - California data
    - Annual values are computed as the average of 12 monthly data points
  - Industrial sectors with sparse data are combined with other sectors

- Two main elements of the adjustment
  - Measurement of wage mix impact in 2021
    - Observed 2020 average wage by industry is compared to a mix-adjusted 2020 average wage
    - Mix-adjusted wage uses:
      - 2020 industrial mix
      - 2020 average wages by industry and wage quartile
      - 2021 distribution of employees by wage quartile within industry

Derivation of CPS Average Wage at 2020 Levels

	B	C				D				E
	2020 Industry Distribution	2020 CPS Quartile Distribution				2020 CPS Average Wage by Quartile				
		1	2	3	4	1	2	3	4	Total
Agriculture & Mining	2.6%	53.9%	24.2%	12.8%	9.1%	12.55	18.35	30.80	62.17	20.78
Utilities & Construction	5.5%	16.0%	28.2%	33.3%	22.5%	12.91	19.54	30.55	63.31	31.98
Manufacturing	7.6%	19.8%	22.5%	25.6%	32.1%	12.80	19.40	30.34	77.71	39.61
Wholesale	3.9%	26.0%	28.8%	25.3%	19.9%	12.99	19.34	30.76	79.29	32.51
Retail	9.2%	40.3%	32.8%	17.4%	9.4%	13.17	18.97	29.88	72.33	23.57
Transportation & Warehousing	4.0%	28.0%	33.7%	25.2%	13.2%	13.13	19.58	31.26	69.08	27.24
Information	3.2%	9.3%	18.4%	25.7%	46.7%	11.71	19.85	32.02	88.17	54.10
Finance & Insurance	3.2%	8.5%	17.7%	31.8%	42.0%	12.88	19.69	31.02	73.78	45.44
Real Estate	1.7%	16.9%	26.8%	24.5%	31.9%	12.20	19.84	31.28	68.33	36.81
Prof. Services & Mgmt. of Companies	9.4%	6.1%	13.3%	29.4%	51.2%	12.67	19.70	31.79	81.81	54.64
Administrative	6.3%	34.8%	36.0%	20.1%	9.1%	12.96	19.21	29.41	76.41	24.29
Education	2.1%	15.8%	23.8%	32.9%	27.5%	12.86	19.72	31.41	63.85	34.61
Health	14.4%	22.9%	24.8%	24.3%	28.0%	13.20	19.40	31.10	67.59	34.33
Arts & Entertainment	1.2%	33.8%	27.1%	21.8%	17.3%	12.45	19.52	30.06	89.86	31.59
Hospitality	7.7%	59.2%	23.1%	12.9%	4.8%	12.78	19.15	29.81	59.53	18.68
Other	2.9%	38.1%	30.4%	18.5%	13.1%	11.59	19.73	31.63	61.20	24.24
Public Administration	15.0%	17.1%	19.5%	32.9%	30.5%	13.03	19.55	31.11	60.52	34.75
All Industries	100.0%	25.5%	24.5%	24.9%	25.0%	12.88	19.38	30.89	71.97	33.75

Sample Column E Calculations

Hospitality: 18.68 = ∑(C x D) = 59.2% x 12.78 + 23.1% x 19.15 + 12.9% x 29.81 + 4.8% x 59.53

All Industries: 33.75 = ∑(B x E)

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Source: March 2022 UCLA Forecast (Column B); 2020 EPI CPS Data Set (Columns C and D)

Derivation of 2021 Wage-Mix Adjusted Average Wage

	B	F				D				G
	2020 Industry Distribution	2021 CPS Quartile Distribution				2020 CPS Average Wage by Quartile				
		1	2	3	4	1	2	3	4	Total
Agriculture & Mining	2.6%	42.3%	30.7%	18.3%	8.8%	12.55	18.35	30.80	62.17	22.03
Utilities & Construction	5.5%	13.1%	28.4%	38.1%	20.3%	12.91	19.54	30.55	63.31	31.77
Manufacturing	7.6%	14.9%	25.6%	26.1%	33.3%	12.80	19.40	30.34	77.71	40.69
Wholesale	3.9%	19.6%	31.6%	30.0%	18.8%	12.99	19.34	30.76	79.29	32.81
Retail	9.2%	36.0%	33.3%	19.9%	10.8%	13.17	18.97	29.88	72.33	24.81
Transportation & Warehousing	4.0%	24.8%	37.5%	25.0%	12.8%	13.13	19.58	31.26	69.08	27.25
Information	3.2%	9.4%	15.0%	27.0%	48.6%	11.71	19.85	32.02	88.17	55.54
Finance & Insurance	3.2%	9.1%	18.6%	31.8%	40.6%	12.88	19.69	31.02	73.78	44.65
Real Estate	1.7%	16.7%	28.4%	29.4%	25.4%	12.20	19.84	31.28	68.33	34.25
Prof. Services & Mgmt. of Companies	9.4%	6.2%	13.7%	30.5%	49.7%	12.67	19.70	31.79	81.81	53.79
Administrative	6.3%	33.2%	32.1%	23.4%	11.3%	12.96	19.21	29.41	76.41	26.00
Education	2.1%	11.6%	22.5%	34.8%	31.1%	12.86	19.72	31.41	63.85	36.73
Health	14.4%	16.8%	28.0%	27.2%	28.1%	13.20	19.40	31.10	67.59	35.06
Arts & Entertainment	1.2%	31.4%	26.8%	26.6%	15.3%	12.45	19.52	30.06	89.86	30.85
Hospitality	7.7%	46.4%	35.2%	13.1%	5.3%	12.78	19.15	29.81	59.53	19.74
Other	2.9%	28.0%	34.5%	24.9%	12.6%	11.59	19.73	31.63	61.20	25.63
Public Administration	15.0%	13.5%	19.8%	35.4%	31.2%	13.03	19.55	31.11	60.52	35.56
All Industries	100.0%	21.0%	26.5%	27.3%	25.1%	12.88	19.37	30.88	71.94	34.37

Sample Column G Calculations

Hospitality: 19.74 = ∑(F x D) = 46.4% x 12.78 + 35.2% x 19.15 + 13.1% x 29.81 + 5.3% x 59.53

All Industries: 34.37 = ∑(B x J)

Estimated Impact

34.37 / 33.75 – 1 = 1.8%

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Source: March 2022 UCLA Forecast (Column B); 2021 EPI CPS Data (Column F); 2020 EPI CPS Data (Column D)

Wage Level Distribution Impact in 2022 - 2024

- The impact of intra-industry changes in wage distributions in 2020-2021 is measurable using observed California data.
- To the extent that low wage employment increases as the economy normalizes, an adjustment in the opposite direction should be made to future years.
  - However, forecasts of future employment by wage level and industry are not available.

- Instead, the WCIRB tested a range of scenarios regarding the unwinding of the 2020-2021 impacts.
  - Full Unwinding: Assumes that the measured 5.7% impact in 2020-2021 would fully reverse over the 2022-2024 forecast horizon.
  - No Unwinding: Assumes that changes to the wage distribution within industries are permanent.
  - Proportional to Industry Mix: Assumes that impacts from the change in the wage distribution within industry will reverse in proportion to the reversal due solely to industrial mix.
  - Midpoint: Assumes a reversal halfway between the Full Unwinding and Proportional to Industry Mix scenarios.

- The midpoint assumption was adopted for the 9/1/2021 filing and is again recommended by staff.

Derivation of Adjusted Average Wage Change

	2020	2021	2022	2023	2024	Cumulative	Annualized				
	Average Wage Change										
UCLA	11.4%	9.8%	2.3%	0.4%	0.5%	13.3%	3.2%	Total	Change Factor Due to Mix		
Department of Finance		6.1%	3.2%	3.6%	3.6%	17.5%	4.1%				
Average of UCLA and DoF	11.4%	8.0%	2.8%	2.0%	2.1%	15.5%	3.7%				
	Industry Mix Adjustment							Unwinding	2020-2021	Culmulative	2022-2024
	-1.8%	0.3%	0.5%	-0.3%	-0.1%	0.4%	0.1%	**0.064**	0.985	0.986	1.001
Scenario	**Wage Mix Adjustments**										
Full Unwinding	-3.9%	-1.8%	3.0%	2.1%	0.9%	4.1%	1.0%	1.000	0.943	1.000	1.060
Midpoint	-3.9%	-1.8%	1.6%	1.1%	0.5%	1.3%	0.3%	0.532	0.943	0.973	1.032
Proportional to Industry Mix	-3.9%	-1.8%	**0.2%**	0.1%	0.1%	-1.5%	-0.4%	0.064	0.943	**0.947**	**1.004**
No Unwinding	-3.9%	-1.8%	0.0%	0.0%	0.0%	-1.8%	-0.5%	0.000	0.943	0.943	1.000
	Adjusted Average Wage Change										
Industry Mix Only	9.4%	8.3%	3.3%	1.7%	1.9%	15.9%	3.8%				
Full Unwinding	5.1%	6.3%	6.3%	3.8%	2.8%	20.6%	4.8%				
Midpoint	5.1%	6.3%	4.9%	2.8%	2.4%	17.4%	4.1%				
Proportional to Industry Mix	5.1%	6.3%	3.5%	1.8%	2.0%	14.2%	3.4%				
No Unwinding	5.1%	6.3%	3.3%	1.7%	1.9%	13.8%	3.3%				
Assumed Unwinding Share			50%	35%	15%						

0.064 = (0.986 - 0.985) / (1 - 0.985)
0.947 = 0.064 x (1 - 0.943) + 0.943

1.004 = 0.947 / 0.943
0.2% = 1.004^50% - 1

02

Review of COVID-19 Claim Diagnostics

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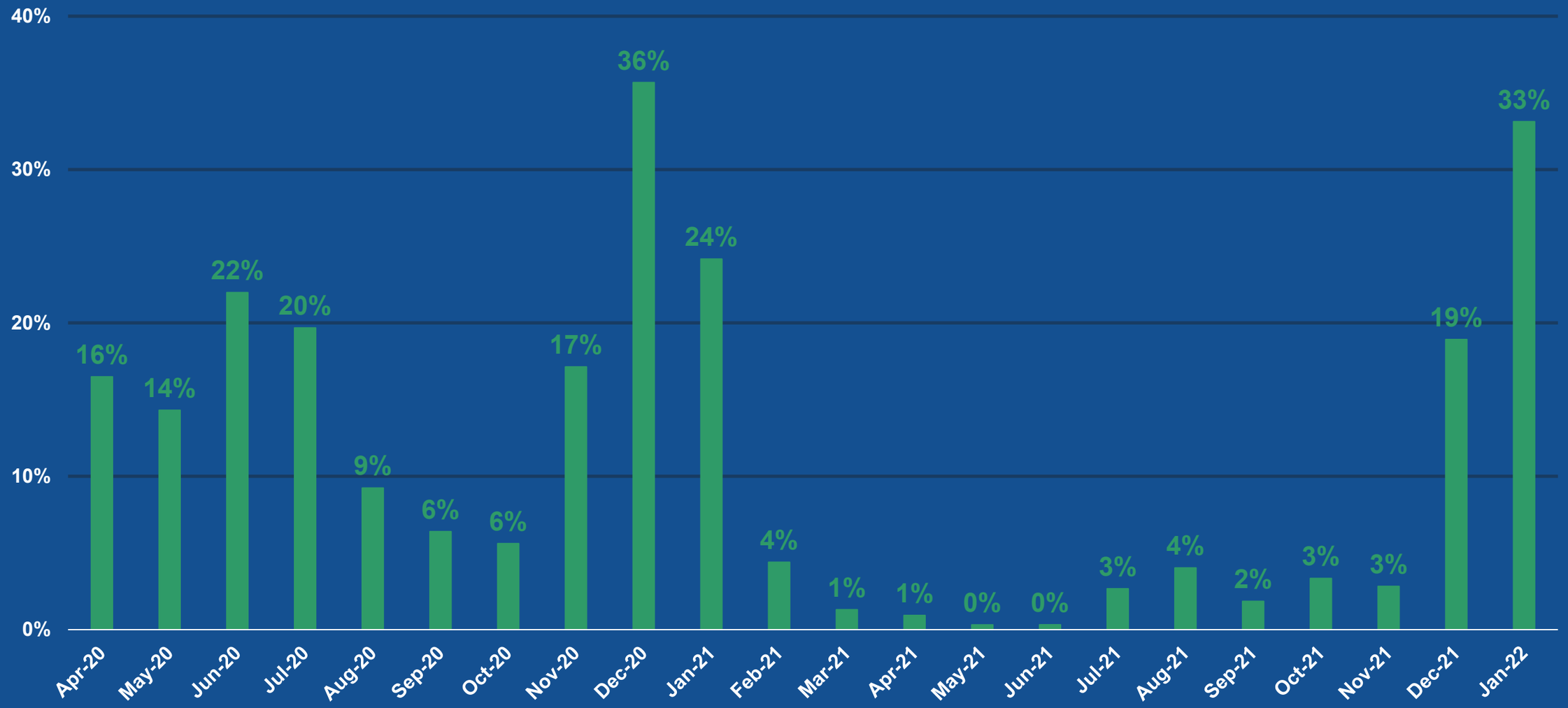
COVID-19 Share of Indemnity Claims

As of February 14, 2022



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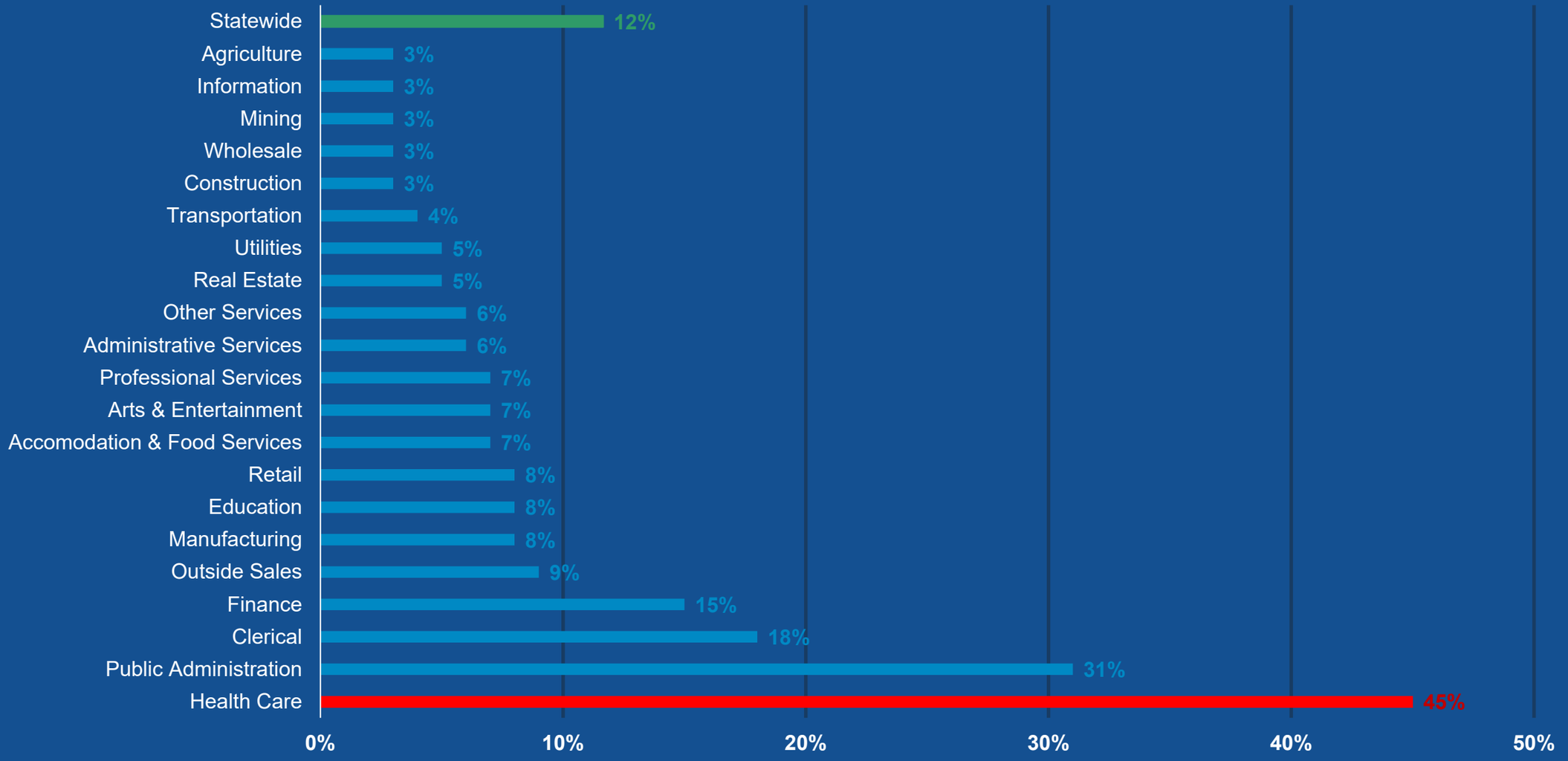
Source: SROI records from WCIRB indemnity transaction data with MTC dates through January 31, 2022

Share of COVID-19 Indemnity Claims By Industry

As of February 14, 2022



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Source: FROI and SROI records from WCIRB indemnity transaction data for claims from April 2020 through January 2022

Industry Distribution of COVID-19 Indemnity Claims by Accident Quarter

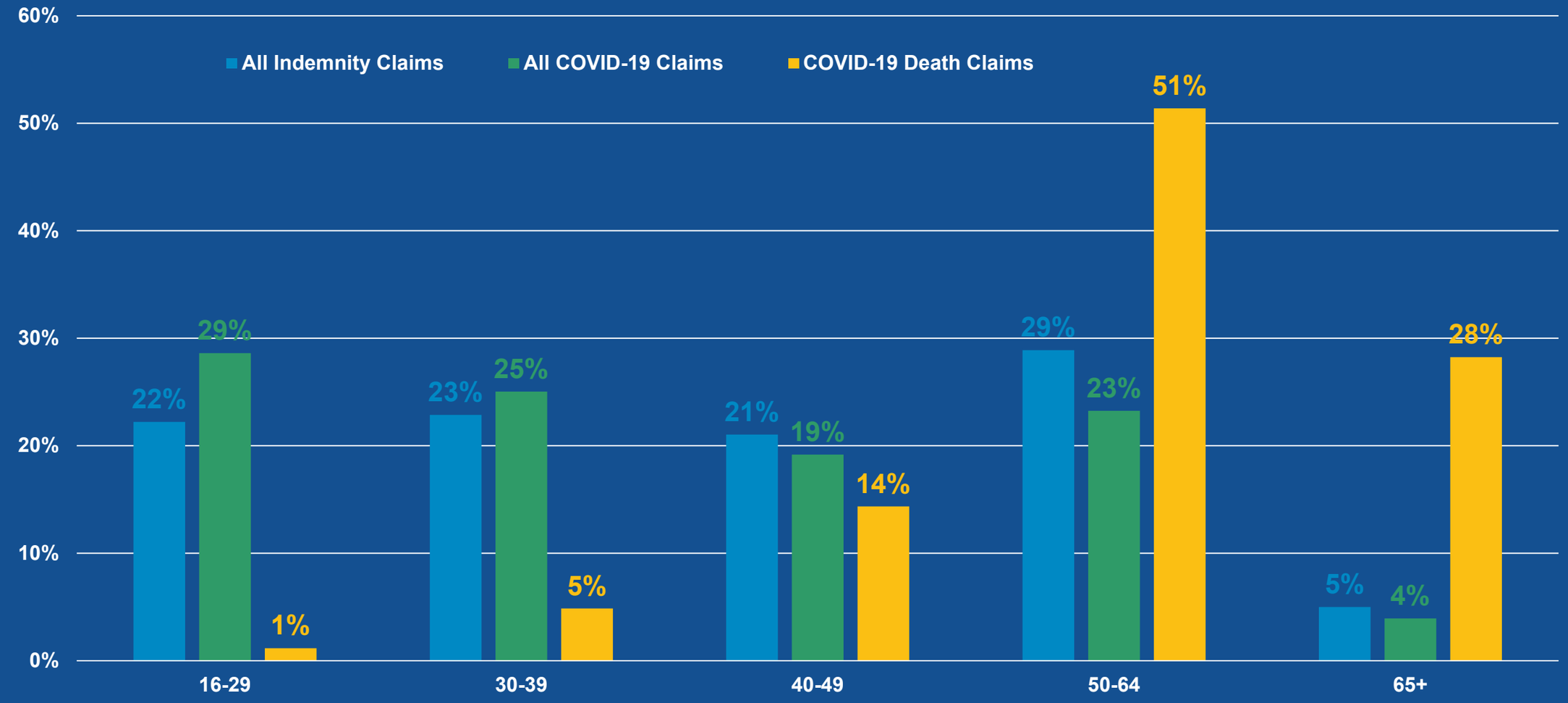
As of February 14, 2022

Industry	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1
Health Care	51%	57%	54%	56%	50%	49%	50%	49%
Manufacturing	11%	8%	9%	9%	13%	10%	4%	6%
Retail	6%	5%	7%	7%	5%	5%	12%	13%
Accomodation & Food Services	4%	6%	4%	4%	2%	7%	15%	13%
Clerical	5%	3%	6%	8%	8%	6%	6%	6%
Transportation	3%	5%	5%	2%	1%	1%	0%	0%
Construction	3%	3%	3%	4%	6%	5%	3%	2%
Administrative Services	4%	4%	1%	1%	1%	2%	1%	2%
Wholesale	3%	2%	3%	2%	3%	1%	2%	2%
Agriculture	3%	2%	0%	1%	1%	2%	0%	0%
Other Services	2%	1%	1%	1%	0%	1%	1%	1%
Real Estate	1%	1%	1%	1%	2%	2%	0%	0%
Outside Sales	1%	1%	1%	1%	0%	0%	0%	1%
Education	0%	1%	1%	1%	3%	1%	2%	1%
Professional Services	1%	1%	1%	1%	0%	2%	1%	1%
Arts & Entertainment	1%	0%	0%	0%	0%	1%	2%	3%
Public Administration	1%	0%	1%	1%	6%	2%	1%	0%
Finance	0%	0%	1%	0%	0%	1%	0%	1%
Information	0%	0%	1%	0%	0%	1%	0%	0%
Utilities	0%	0%	0%	0%	0%	0%	0%	0%
Mining	0%	0%	0%	0%	0%	0%	0%	0%

Source: FROI and SROI records from WCIRB indemnity transaction data for claims from April 2020 through January 2022

Injured Worker Age Distribution

As of February 14, 2022



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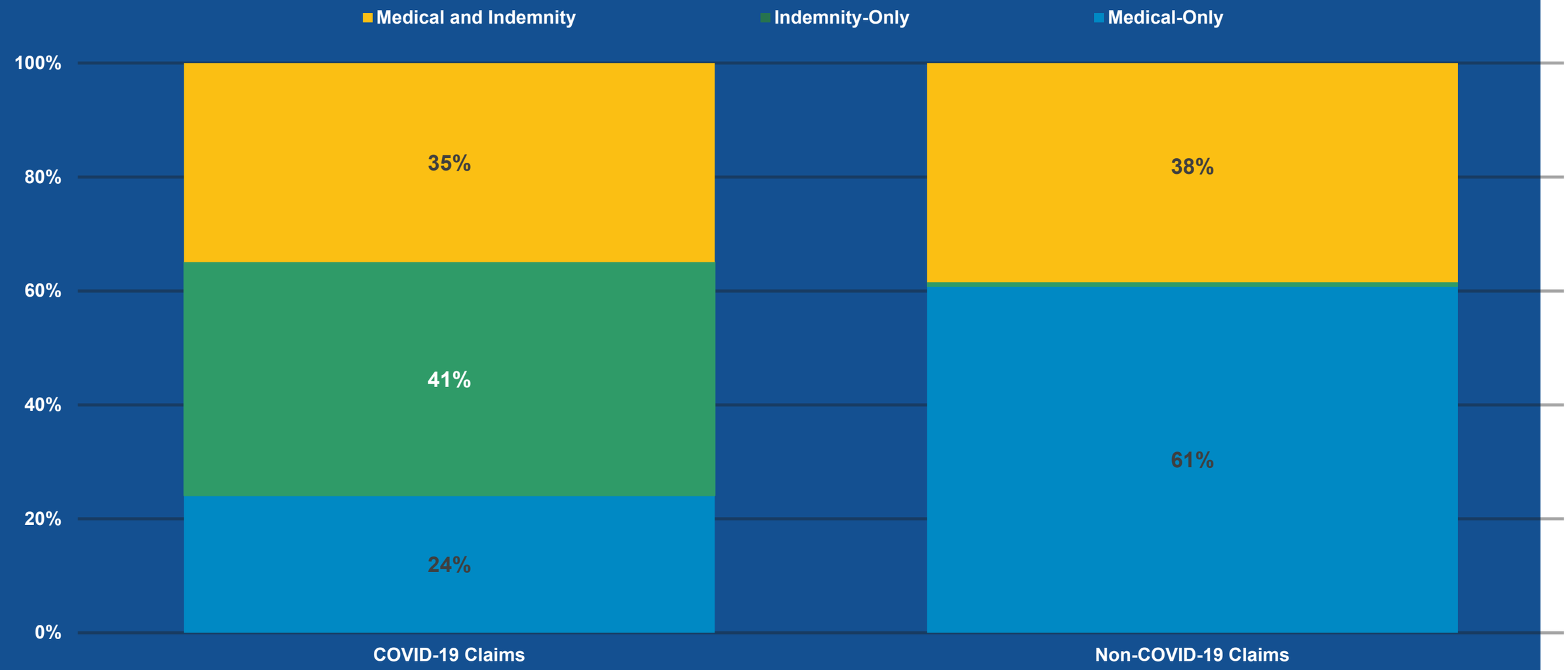
Source: FROI and SROI records from WCIRB indemnity transaction data for claims from April 2020 through January 2022

Share of Claims by Type of Claim

Accident Year 2020

As of February 14, 2022



WCIRB California™
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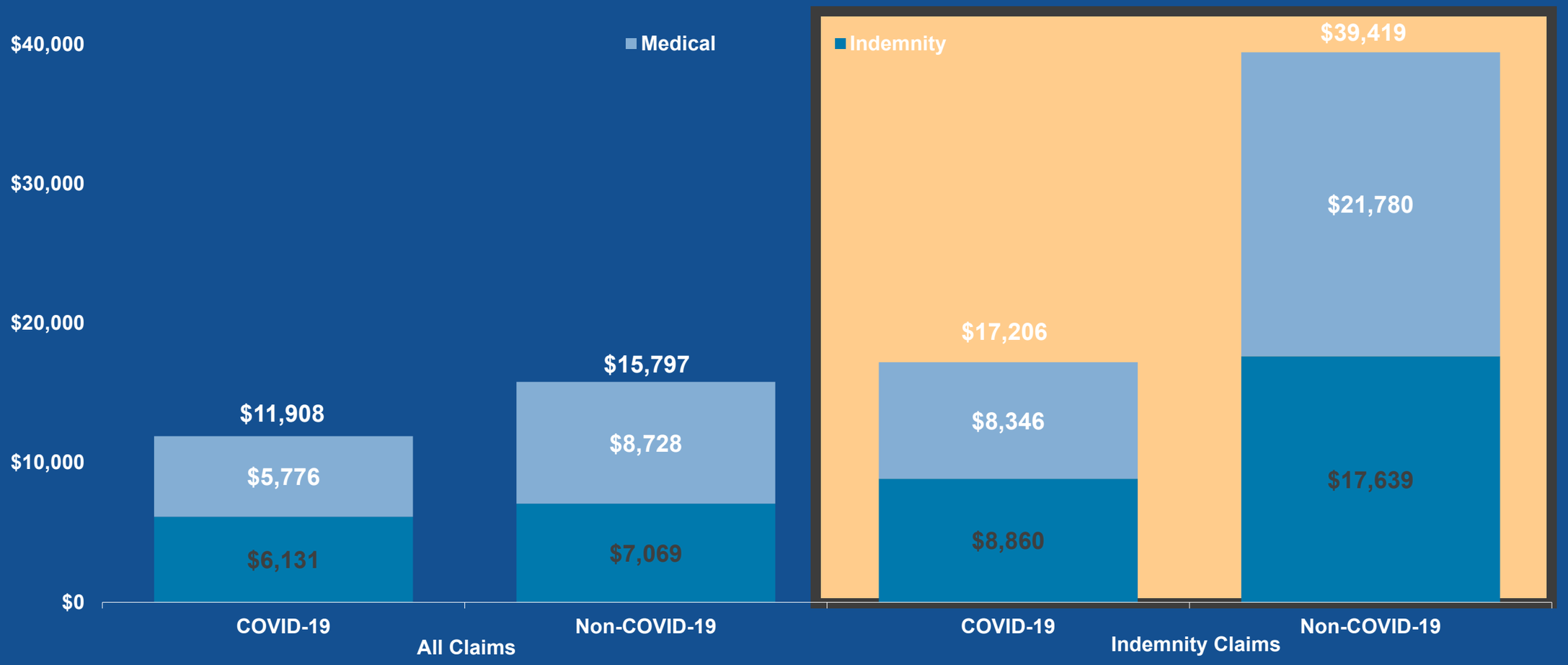
Source: AY 2020 claims from PY 2019 & 2020 USRs at first report with Accident Date of 4/1/2020 or later

Accident Year 2020 Incurred Severities

As of December 31, 2021



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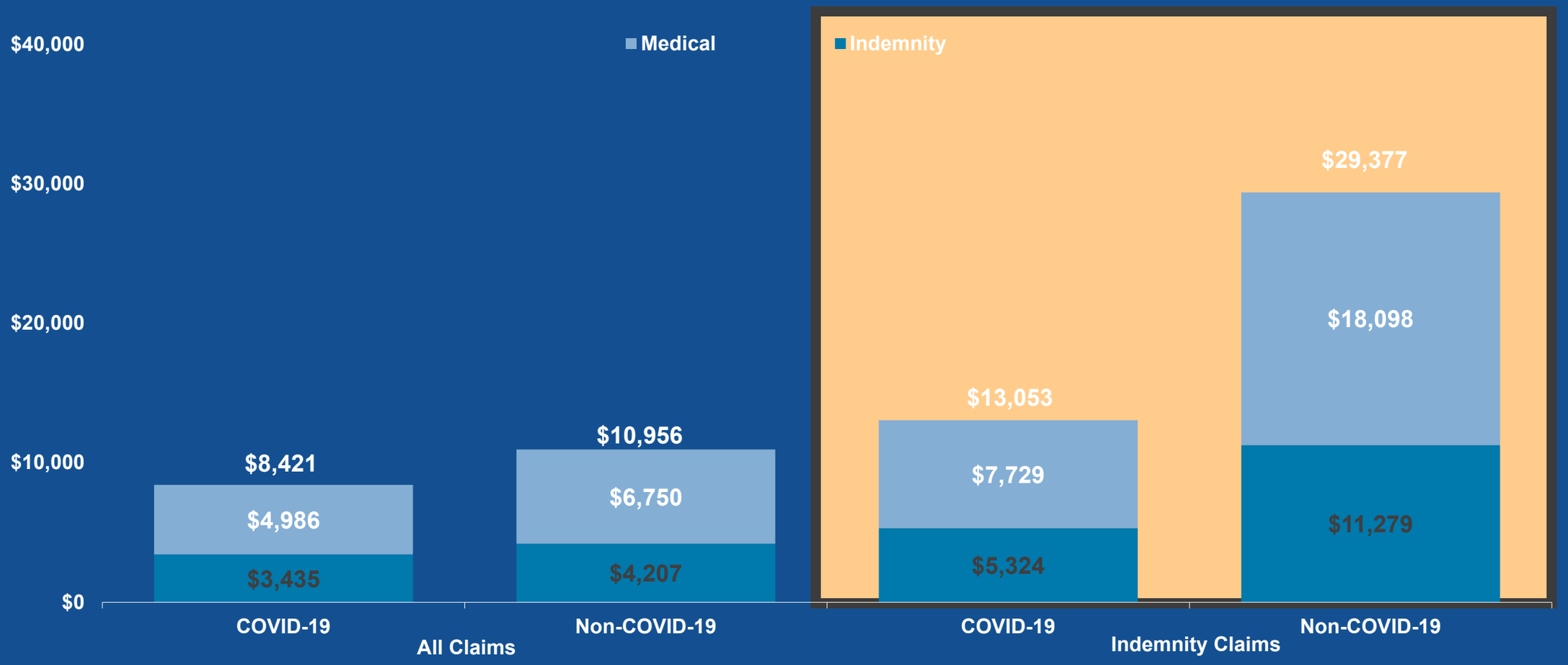
Source: WCIRB Aggregate Financial Data

Accident Year 2021 Incurred Severities

As of December 31, 2021



WCIRB California™
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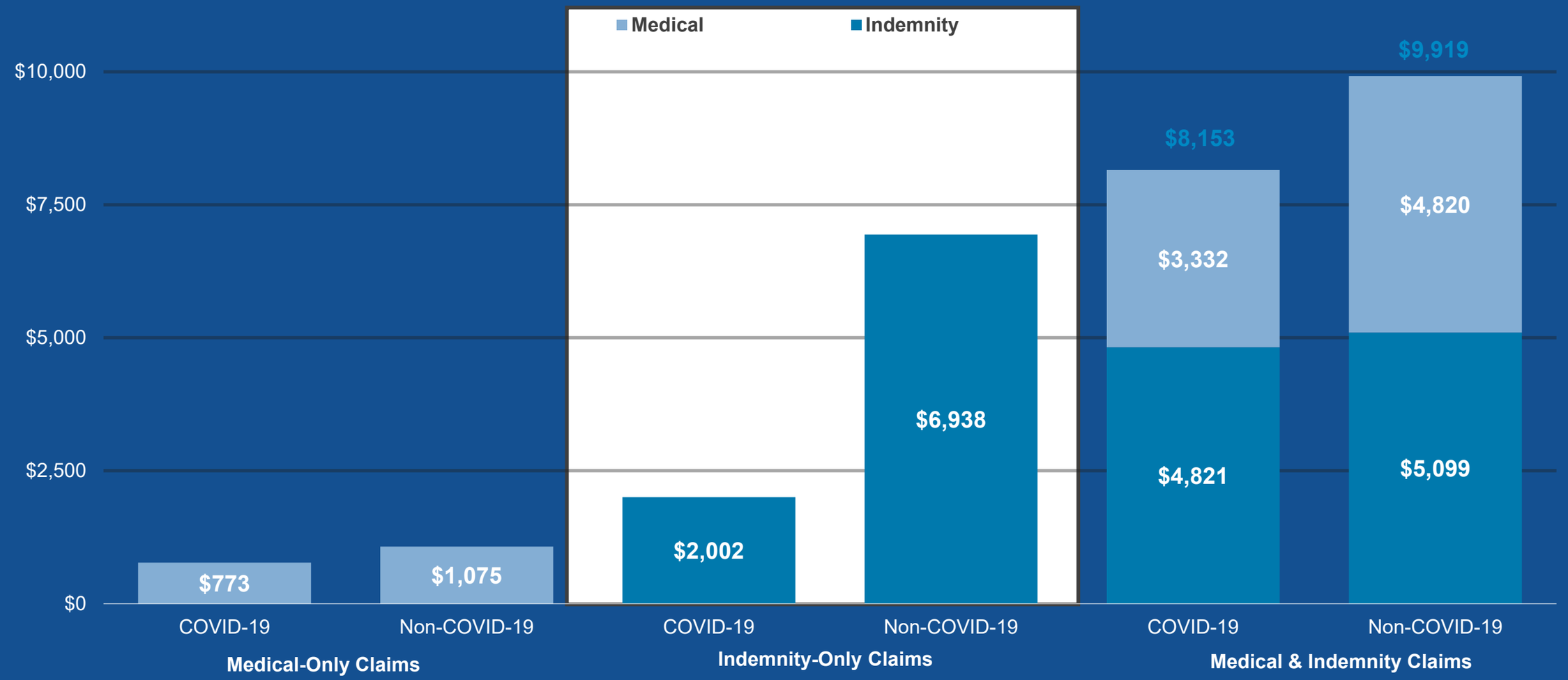
Source: WCIRB Aggregate Financial Data

Closed Claim Severity by Type of Claim

Accident Year 2020

As of February 14, 2022



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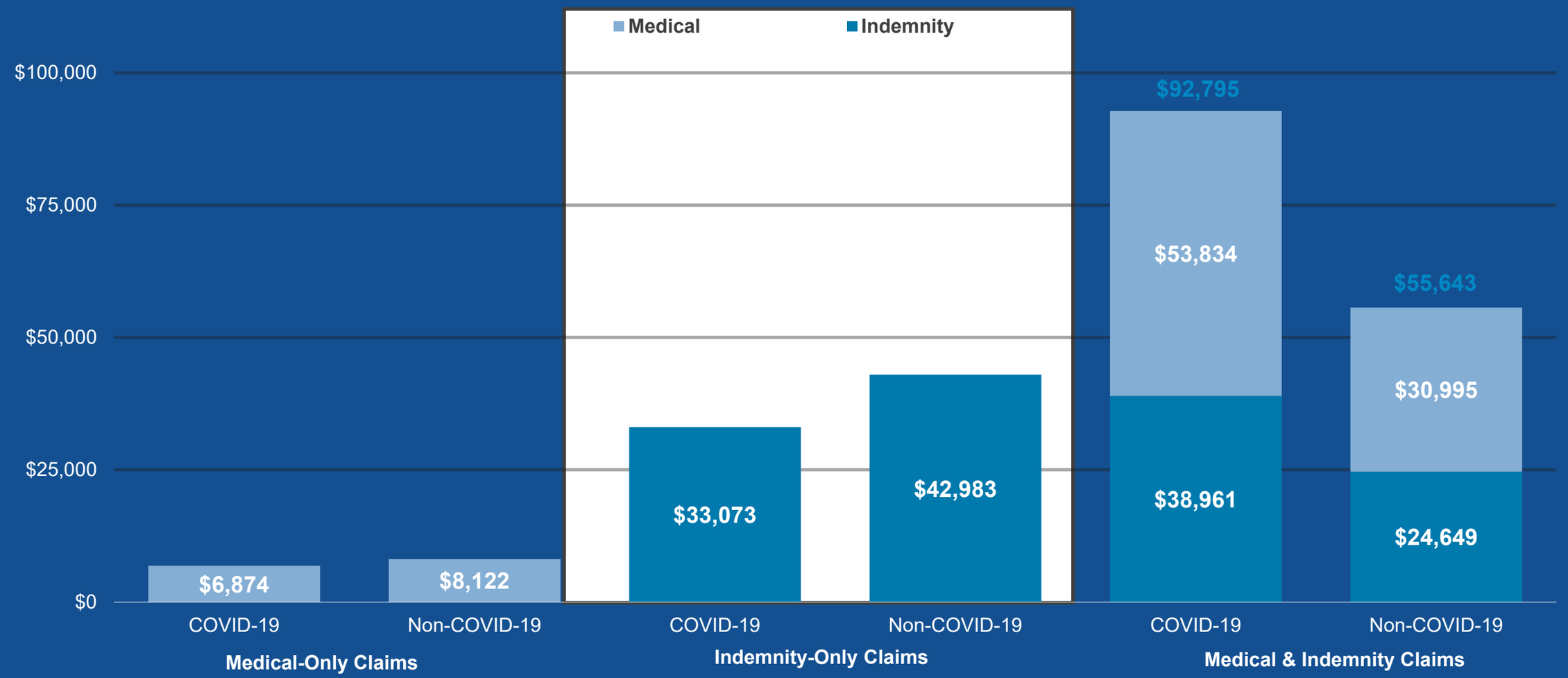
Source: AY 2020 claims from PY 2019 & 2020 USRs at first report with Accident Date of 4/1/2020 or later

Open Claim Severity by Type of Claim
Accident Year 2020

As of February 14, 2022



WCIRB California™
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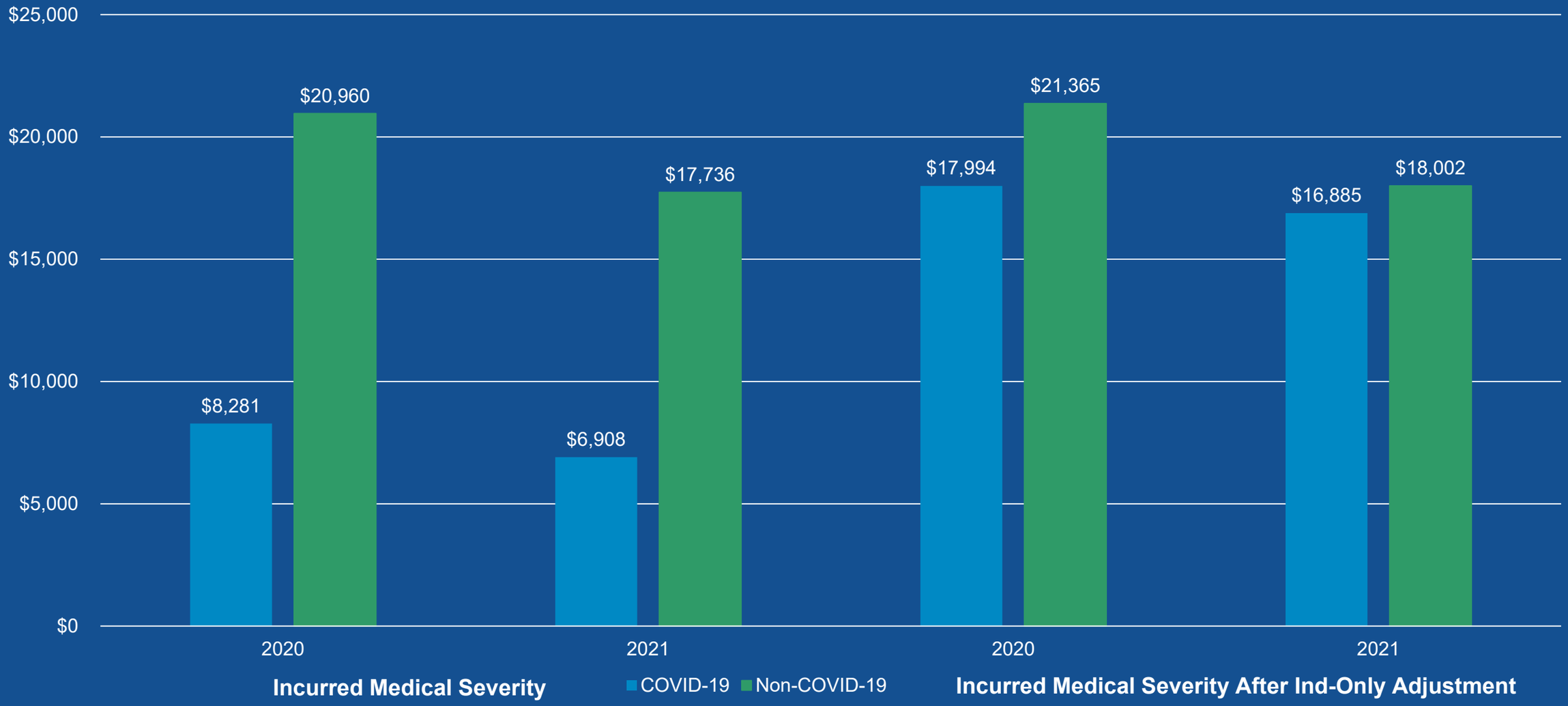
Source: AY 2020 claims from PY 2019 & 2020 USRs at first report at first report with Accident Date of 4/1/2020 or later

Comparison of Incurred Medical Severity on COVID-19 and Non-COVID-19 Claims Adjusted for the Share of Indemnity-Only Claims

As of September 30, 2021

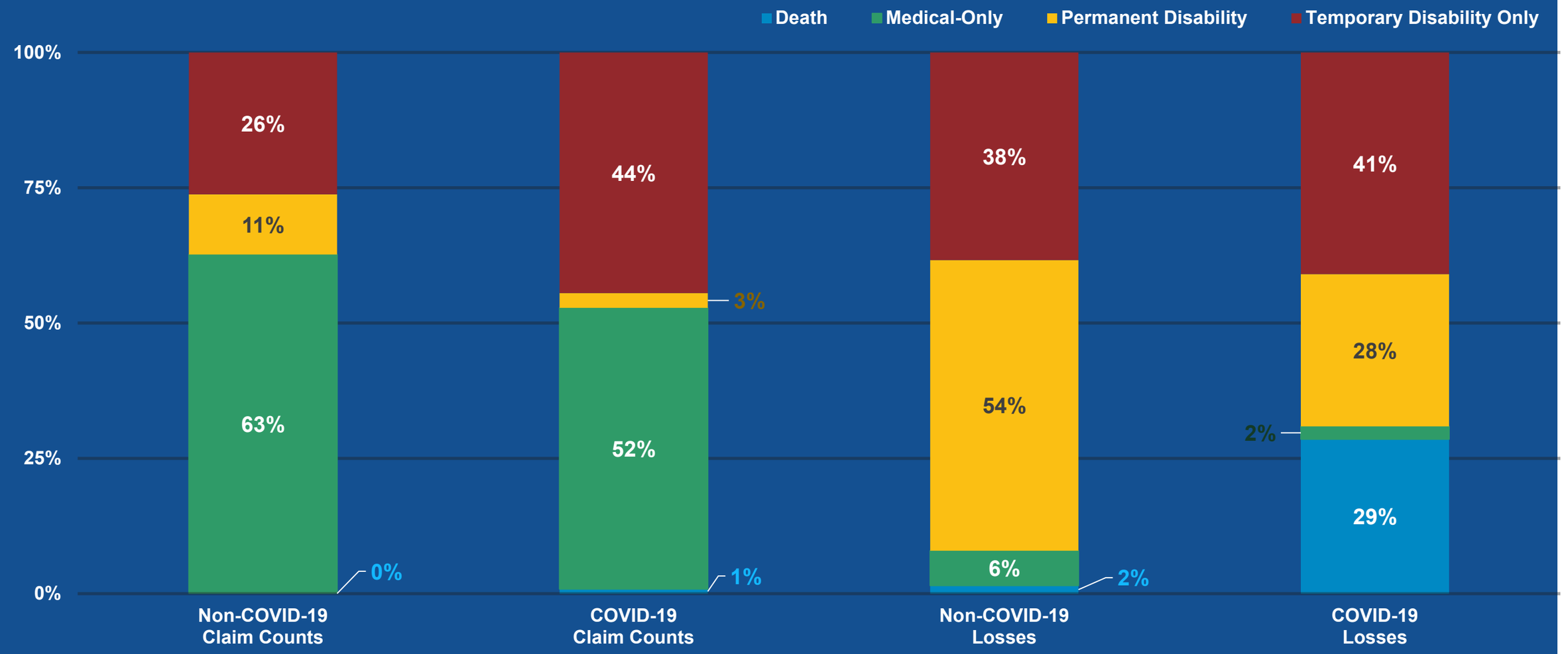


Source: WCIRB Aggregate Financial Data and Share of Indemnity-Only claims from AY 2020 & 2021 on PY 2019 & 2020 USRs at first report for claims with Accident Date of 4/1/2020 or later
Incurred medical severities are adjusted to estimate the incurred medical severity on indemnity claims with medical payments by dividing the incurred medical severity by (1 – estimated share of indemnity-only claims).

Distribution of Claims and Incurred Losses by Claim Type

Accident Year 2020

As of February 14, 2022



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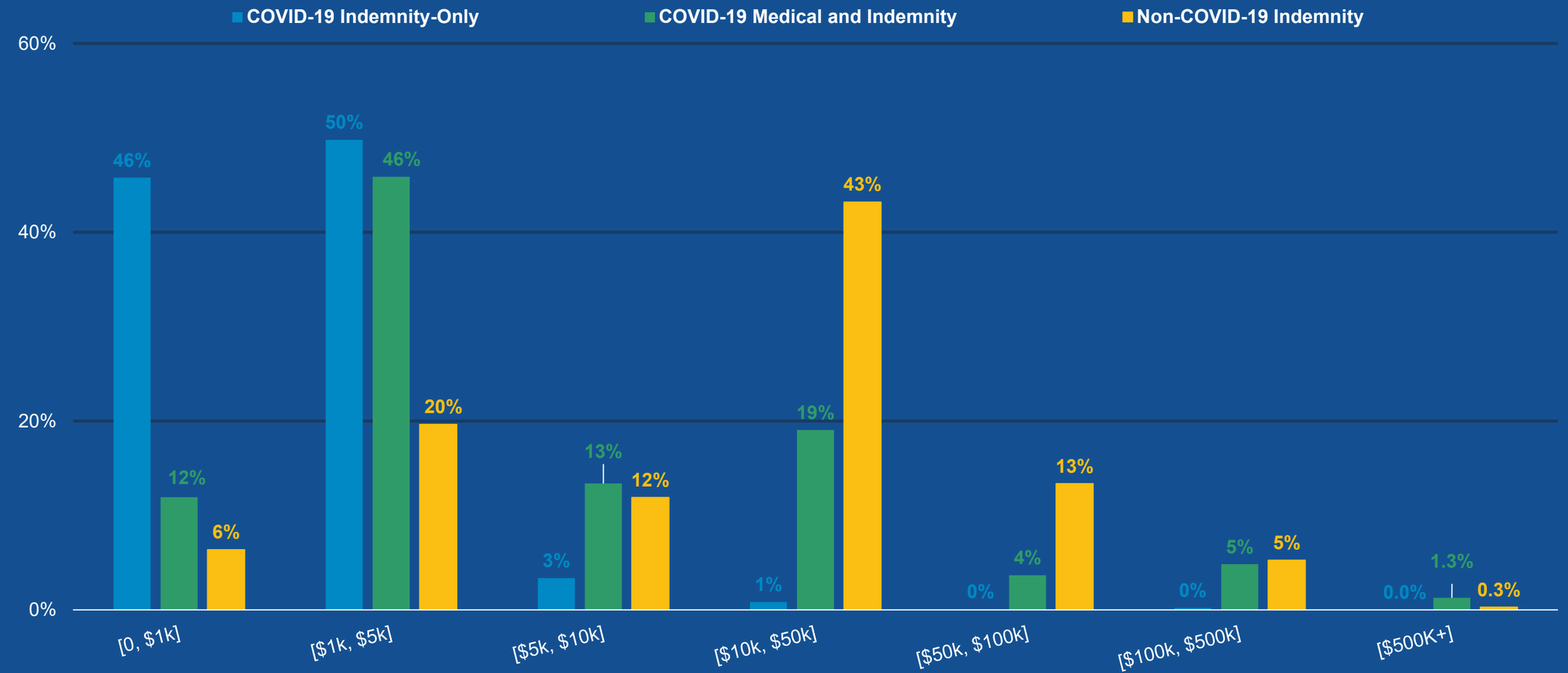
Source: AY 2020 claims from PY 2019 and 2020 USRs at first report at first report with Accident Date of 4/1/2020 or later

Indemnity Claim Distribution by Incurred Loss Size

Accident Year 2020

As of February 14, 2022



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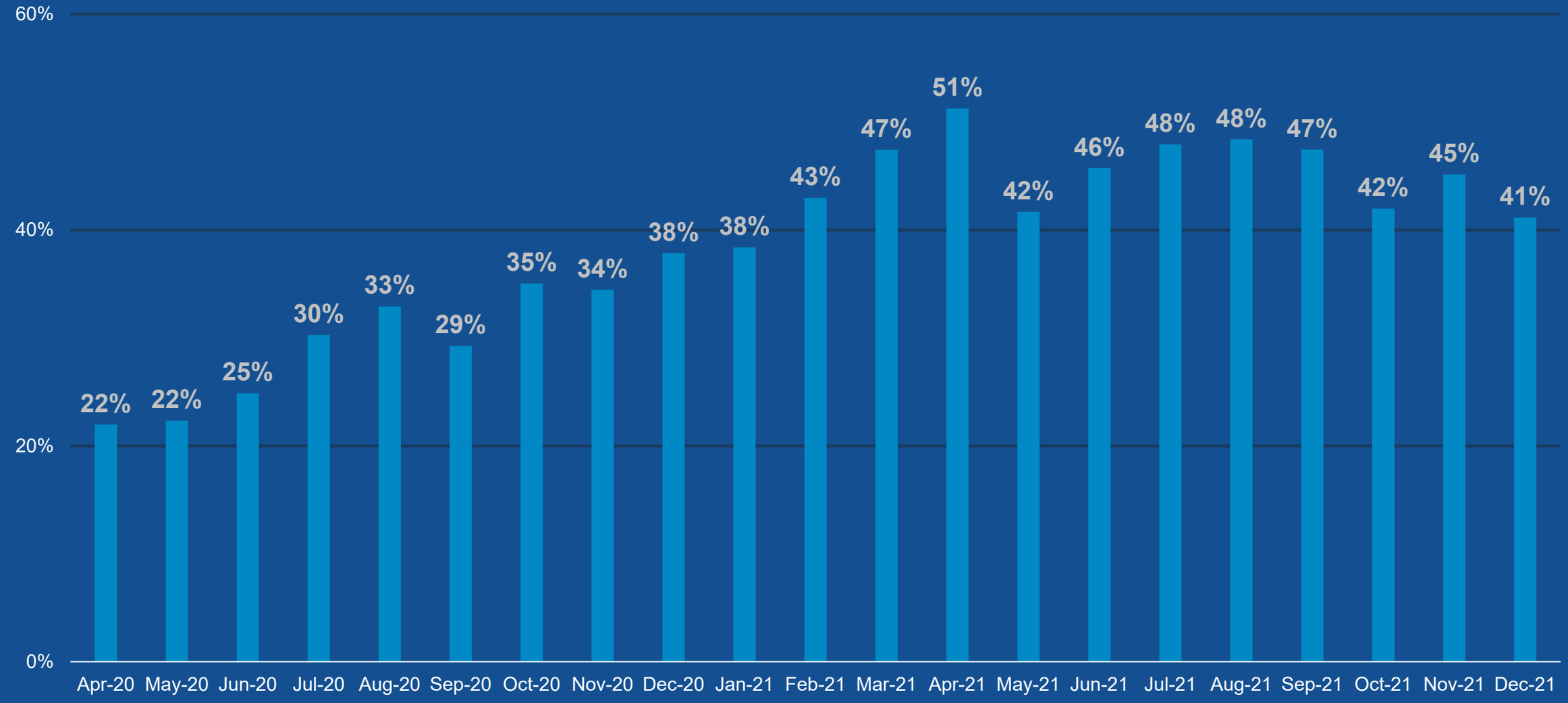
Source: AY 2020 claims from PY 2019 and 2020 USRs at first report at first report with Accident Date of 4/1/2020 or later

COVID-19 Claim Denial Rates By Accident Month

As of February 14, 2022



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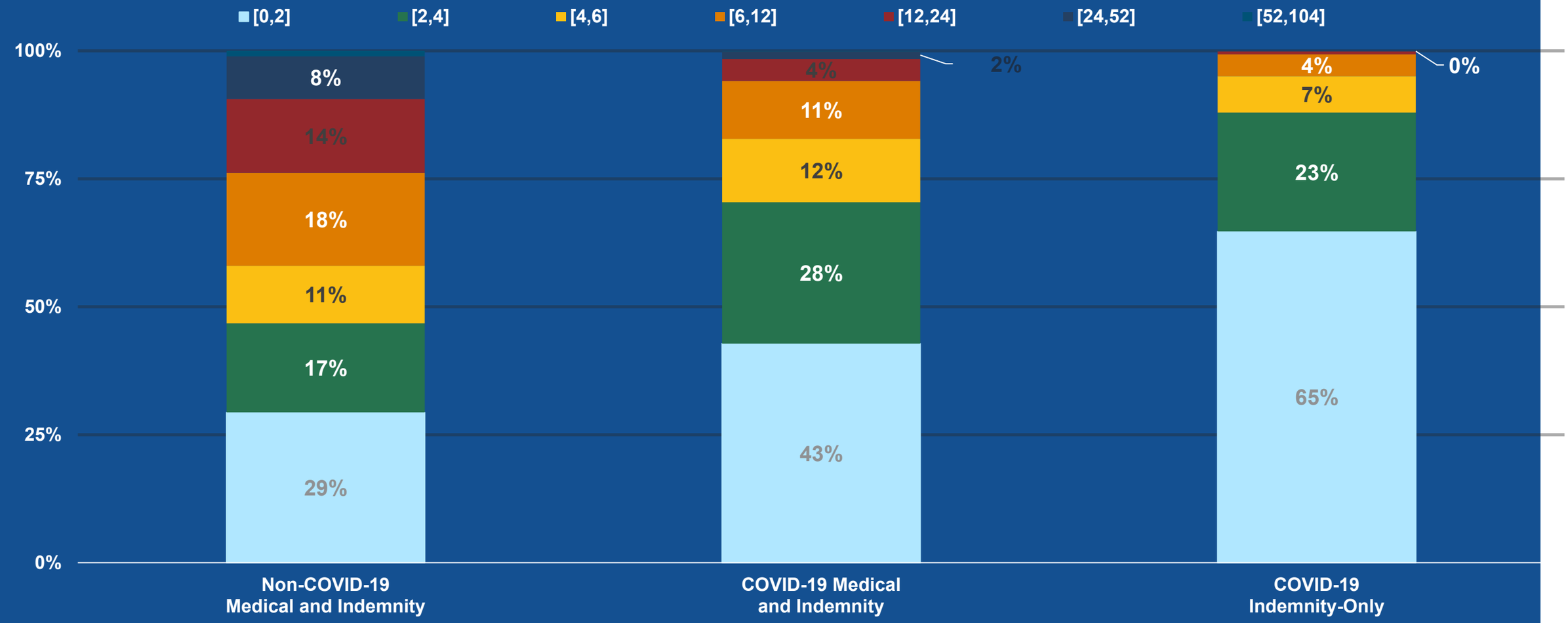
Source: FROI records from WCIRB indemnity transaction data for claims from April 2020 through January 2022

Weeks of Temporary Disability by Claim Type

Closed Claims Only

As of February 14, 2022



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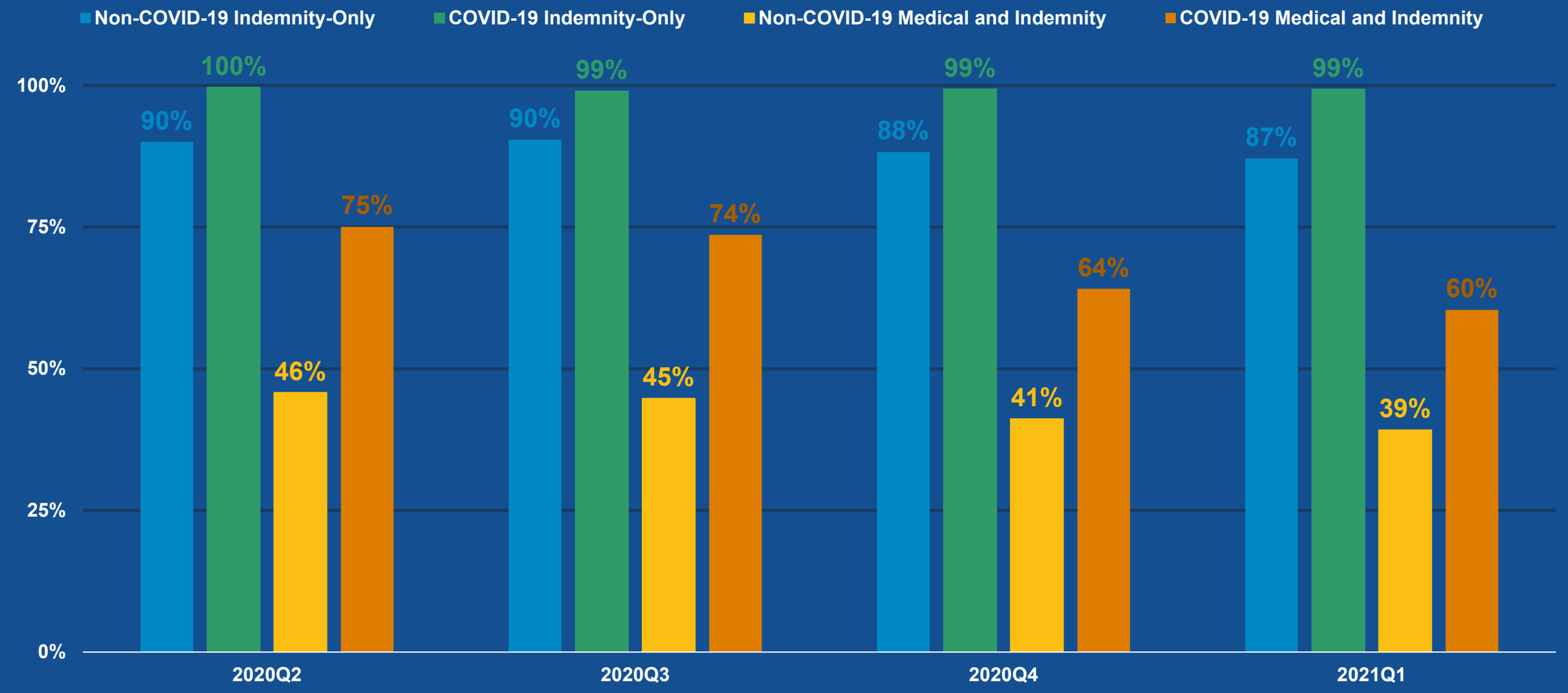
Source: Accident Year 2020 FROI & SROI records from WCIRB indemnity transaction data for claims from April 2020 through January 2022

Indemnity Claims Closing Rates

As of February 14, 2022



WCIRB California™
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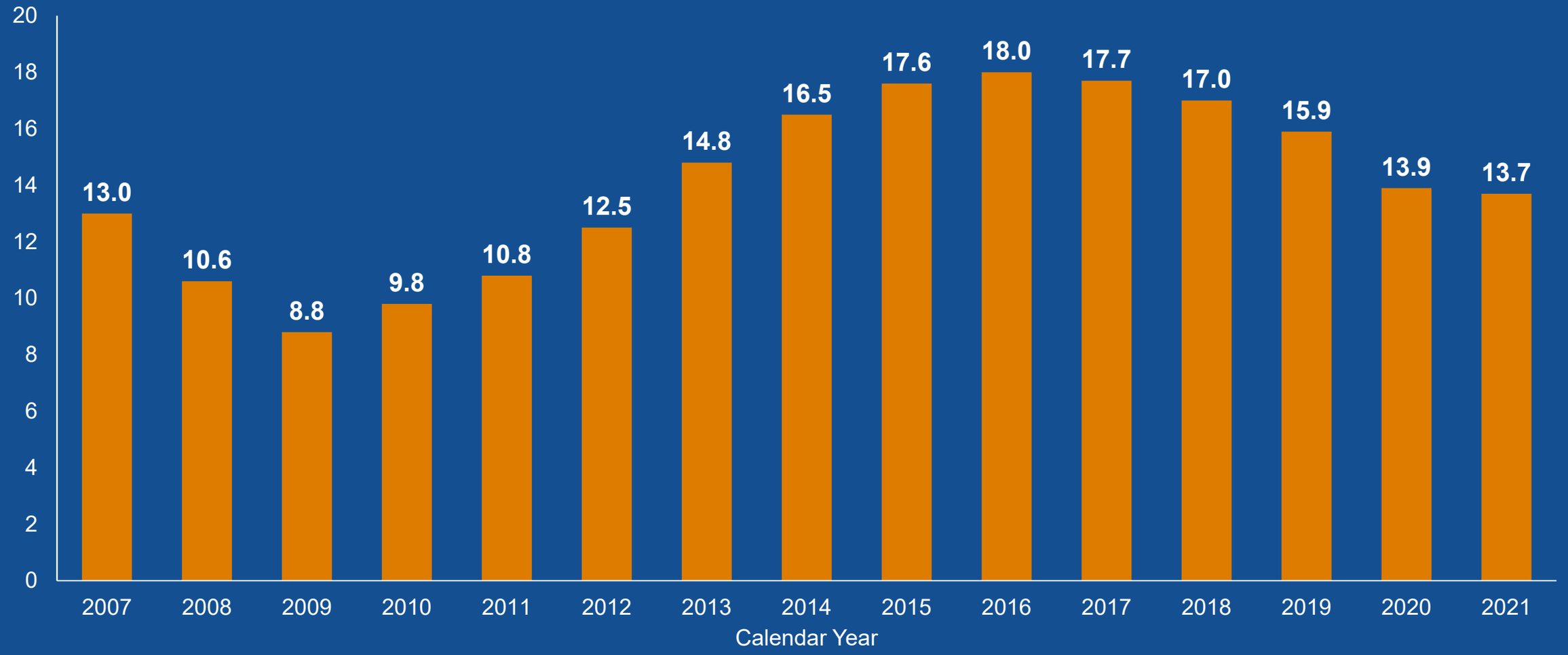
Source: AY 2020 and 2021 claims from PY 2019 and 2020 USRs at first report with Accident Date of 4/1/2020 or later

03

Pandemic Impact on Premium Measures

Insurer Written Premium (in $Billions)

As of December 31, 2021



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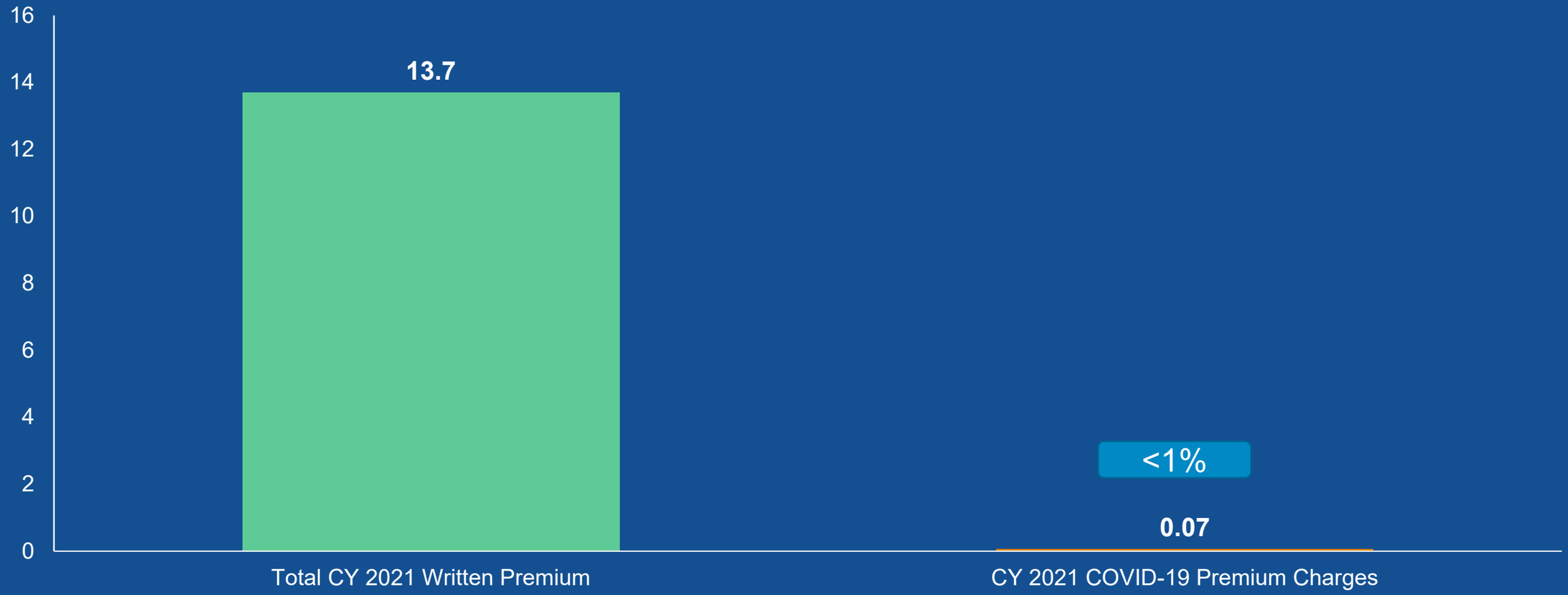
Source: WCIRB aggregate financial data

COVID-19 Premium Charges for Calendar Year 2021 ($Billions)

As of December 31, 2021



WCIRB California™
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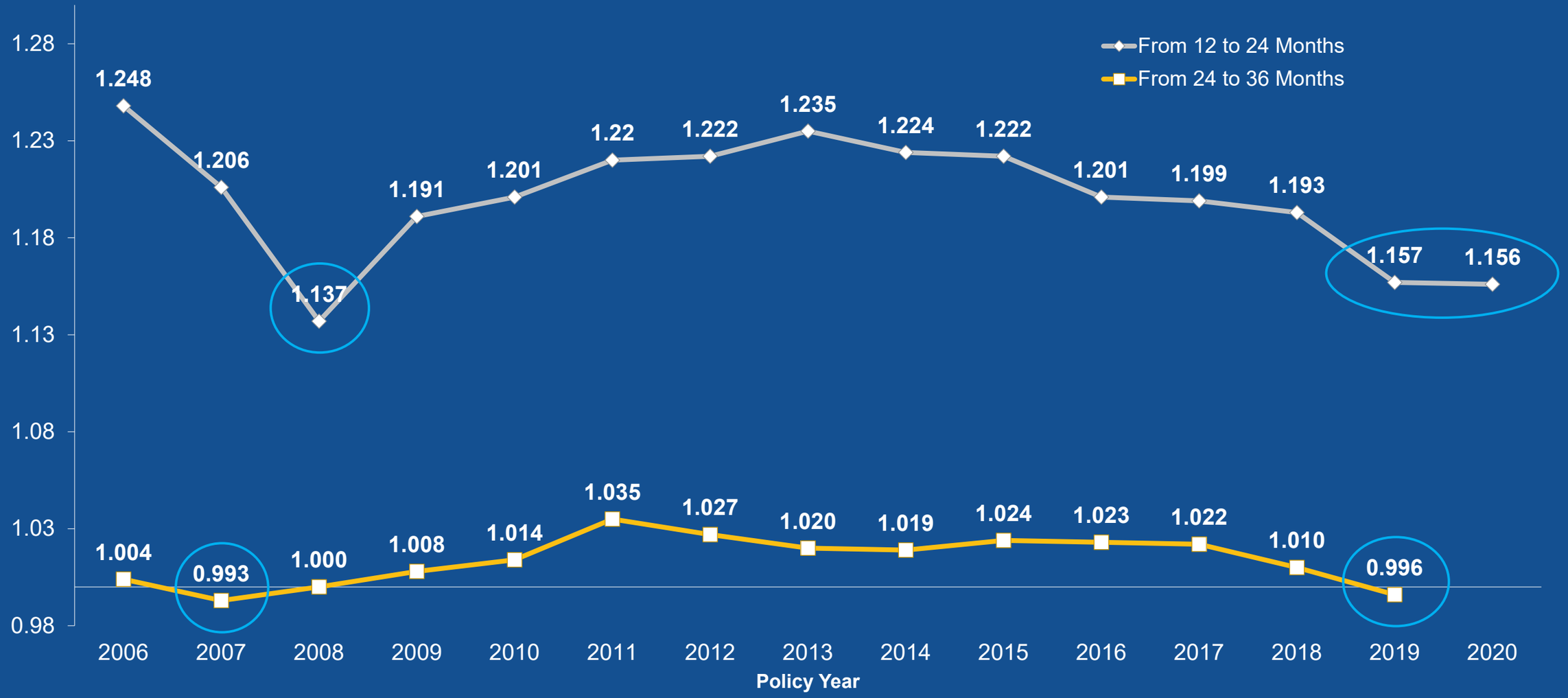
Source: WCIRB aggregate financial data

Development of Insurer Written Premium (Exhibit 1)

As of December 31, 2021



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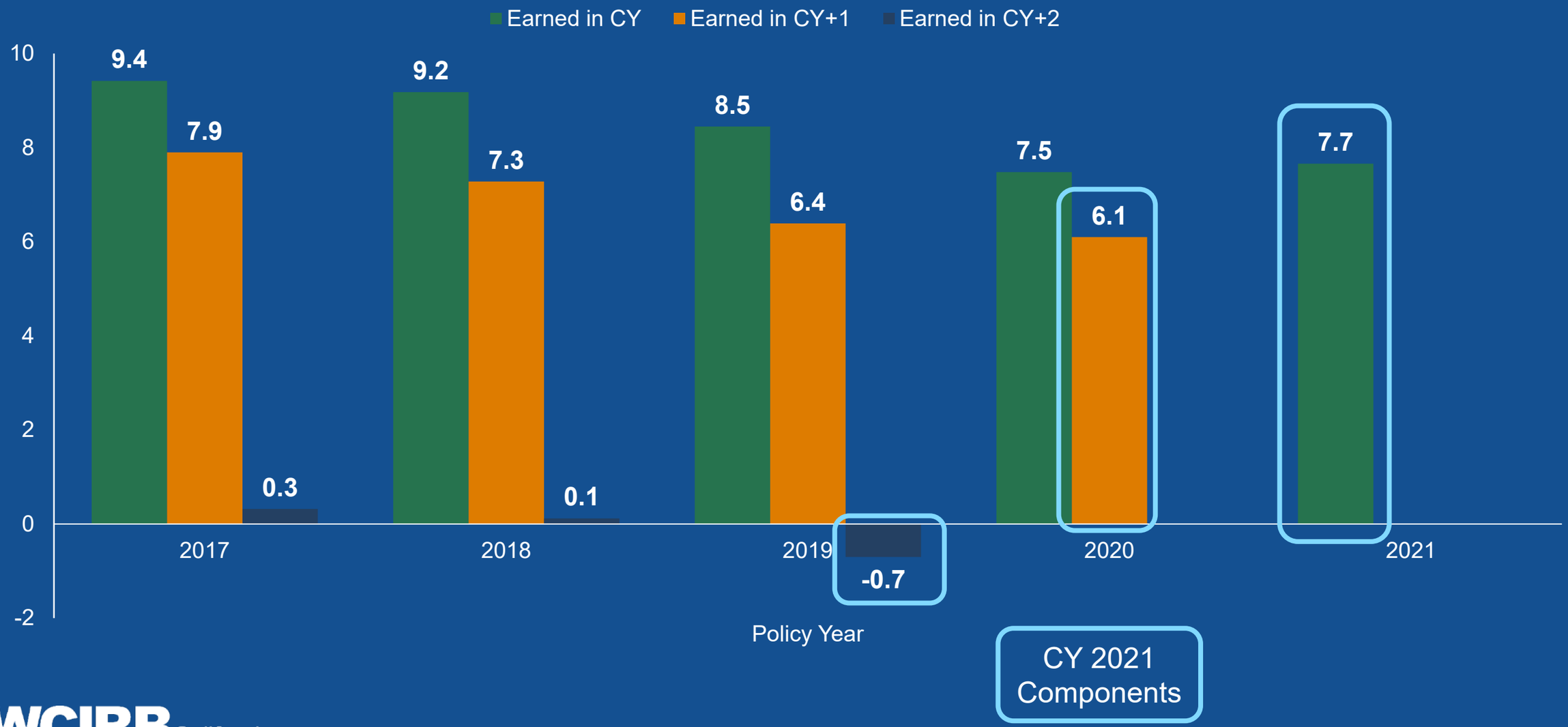
Source: WCIRB aggregate financial data

Insurer Earned Premium Policy Year Comparison (in $Billions)

As of December 31, 2021



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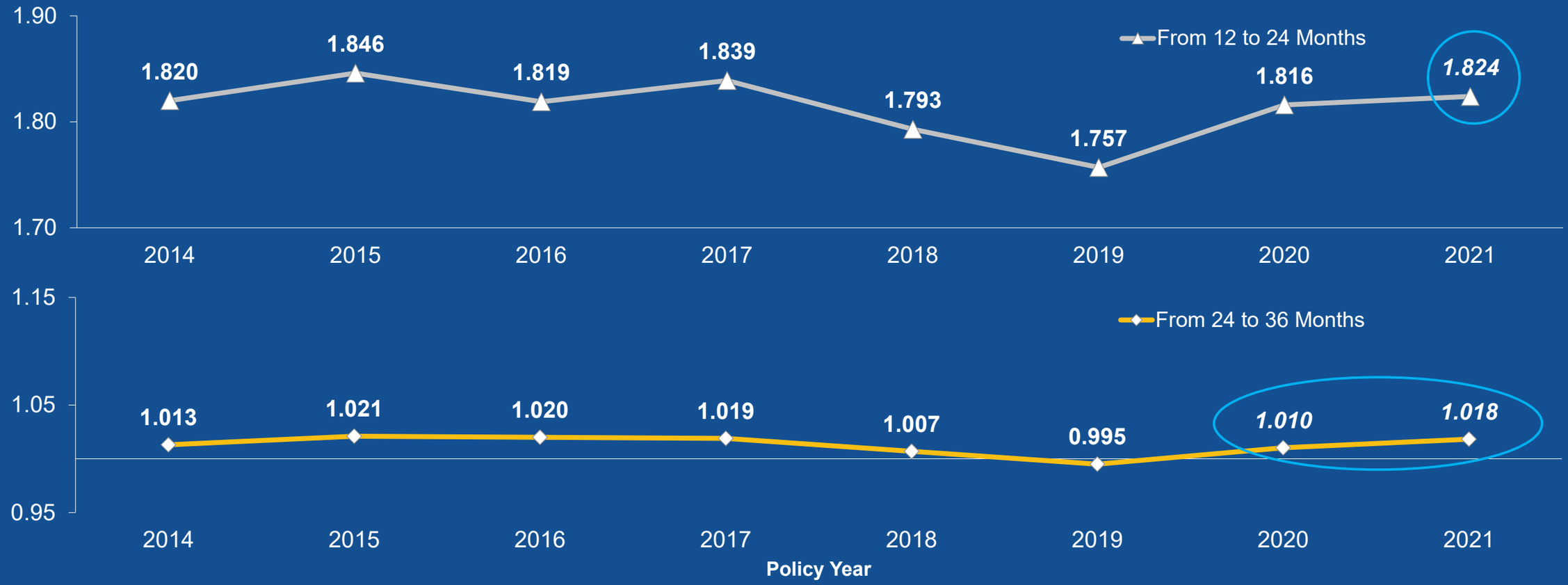
Source: WCIRB aggregate financial data

Earned Premium Development Factor Projection

As of December 31, 2021



PY 2020 Selection: Average of Latest 4 Years
PY 2021 Selection: Average of Latest 4 Pre-pandemic Years

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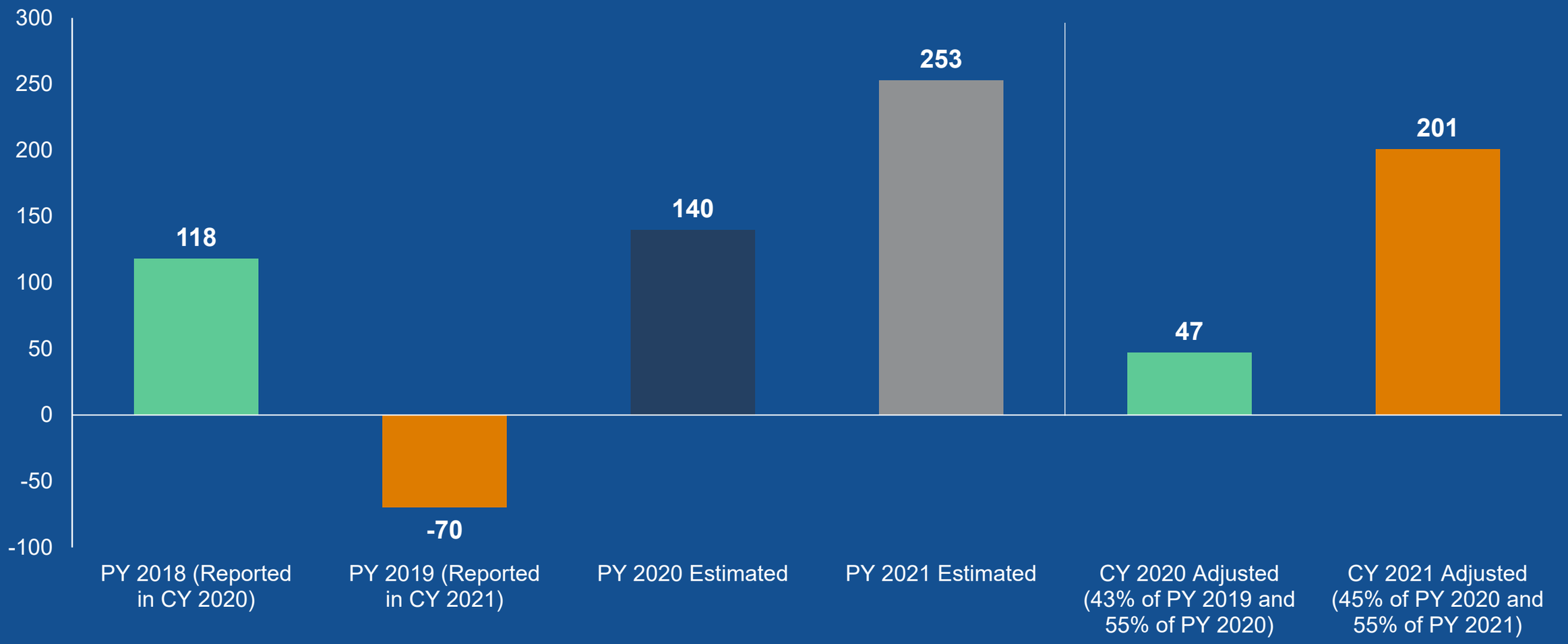
Source: WCIRB aggregate financial data

24 to 36 Month Earned Premium (in $Millions)

As of December 31, 2021



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Source: WCIRB aggregate financial data. Premiums were weighted from PY to CY based on the observed distribution of the 12 and 24 month earned premium amounts.

Adjustment for Changes in Audit Premiums

CY	Reported Earned Premium Before Audits (1)	Estimated Audit Premium (2)	Adjusted Earned Premium (3) = (1) + (2)	Reported Earned Premium (4)	Factor for Audit Premium Adjustment (5) = (3) / (4)
2020	$13,870	$47	$13,916	$14,051	0.990
2021	$13,754	$201	$13,956	$13,618	1.025

$s are in Millions

04

Indemnity Claim Frequency Model

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Background

- For over a decade, the WCIRB Indemnity Claim Frequency Model has been used to project indemnity claim frequency for pure premium ratemaking
- In 2021, Staff undertook a comprehensive review of the model and presented the results at the December Actuarial Committee meeting
- The Committee accepted the report and agreed that these recommendations should be reflected in the updated model forecast for December 31, 2021 experience

Continuing Features of the Model – Committee Recommendations

- Use a linear model to forecast frequency change
- Use all available historic years to parameterize the model
- Incorporate the benefit level as one of the explanatory variables
- Incorporate the CII as one of the explanatory variables
- Incorporate as an explanatory variable an economic variable which is a principal components transformation of aggregate employment and the unemployment rate

Key Changes to the Frequency Model – Committee Recommendations

Model Parameterization

- Incorporate the Cal-OSHA variable into the hazardousness adjustment
- Forecast the cumulative injury index (CII) using a time series model and incorporate into the frequency projection instead of assuming no change in the CII for future years
- Use the fitted constant term with no adjustments. Previously the constant was tempered but forecasting the CII reduced the need for the adjustment
- Incorporate a non-leading benefit level term which excludes cost of living adjustments instead of a leading benefit level term which includes cost of living adjustments

Trending Considerations

- For projections one year out, review an initial estimate averaging the model estimate with the initial estimate based on the aggregate data. Review the differences and consider if there are reasons to indicate that one is more reliable than the other.
- For projections further out, consider adjusting the model forecast if there is a significant difference between the initial aggregate emergence and the model forecast for one year out using the criteria and methodology described in the report.

Goals of March Committee Review

- Review the implemented changes to the model
- Review the proposed adjustment to calculation of the change in the cumulative injury index (CII) for the latest (partial) accident year (AY) unit statistical report (USR) data to better estimate the final change in the CII based on the complete AY USR data
- Explore recent changes in the CII by AQ

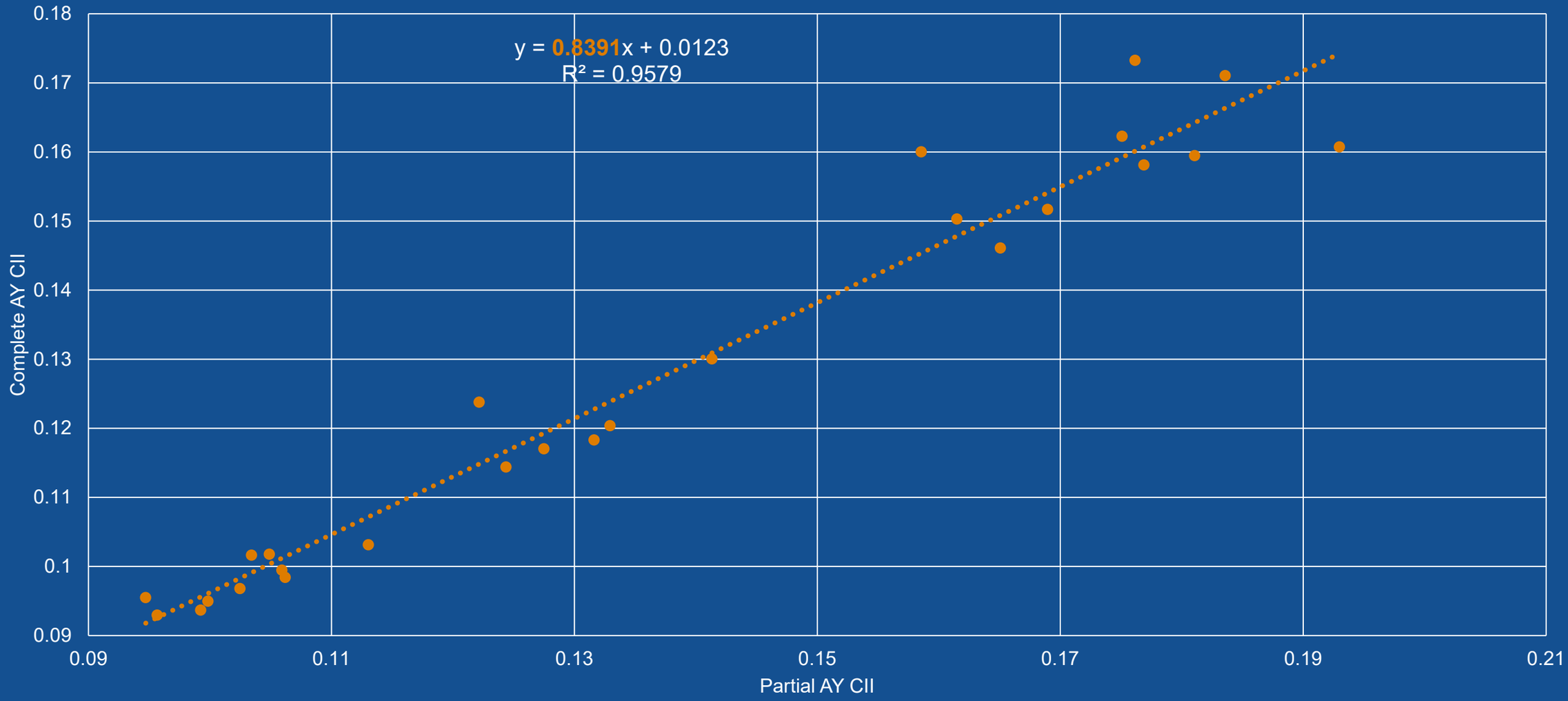
Implementation of Committee Recommendations

- Previously, as our forecast of the CII was no change for future years, forecasting the change in non-cumulative frequency was equivalent to forecasting both the change in total frequency and the change in cumulative frequency
- With a non-zero forecasted change in the CII, the changes in the three measures differ
- Steps to project the change in the total frequency:
  - Project the change in the non-cumulative frequency based on the changes in all model variables
  - Calculate the projected non-cumulative frequency
  - Calculate the cumulative frequency based on the predicted non-cumulative frequency and the forecasted CII
  - Sum the projected non-cumulative and cumulative frequency
  - Calculate the log difference between the projected total frequency and the prior total frequency

Estimating the Change in the CII for the Latest AY

- The frequency model incorporates USR data to estimate the class adjusted frequency by AY
- As USR data is on a policy year (PY) basis, the latest year of available AY data will contain data from the prior PY only
- Our review found that the estimated CII level based on the partial year data was consistently higher than the level of the CII based on the complete year of data
- Without adjustment, this would overestimate the change in the CII between AYs
- Our analysis found that assuming that the change in the CII for the complete year is the same as the change between the partial year is the most accurate adjustment method
- This is how the change for the latest year has been calculated previously. To project the CII via time series, we need to use this change to estimate the CII for the latest AY.

Difference in the Partial AY and Complete AY CII



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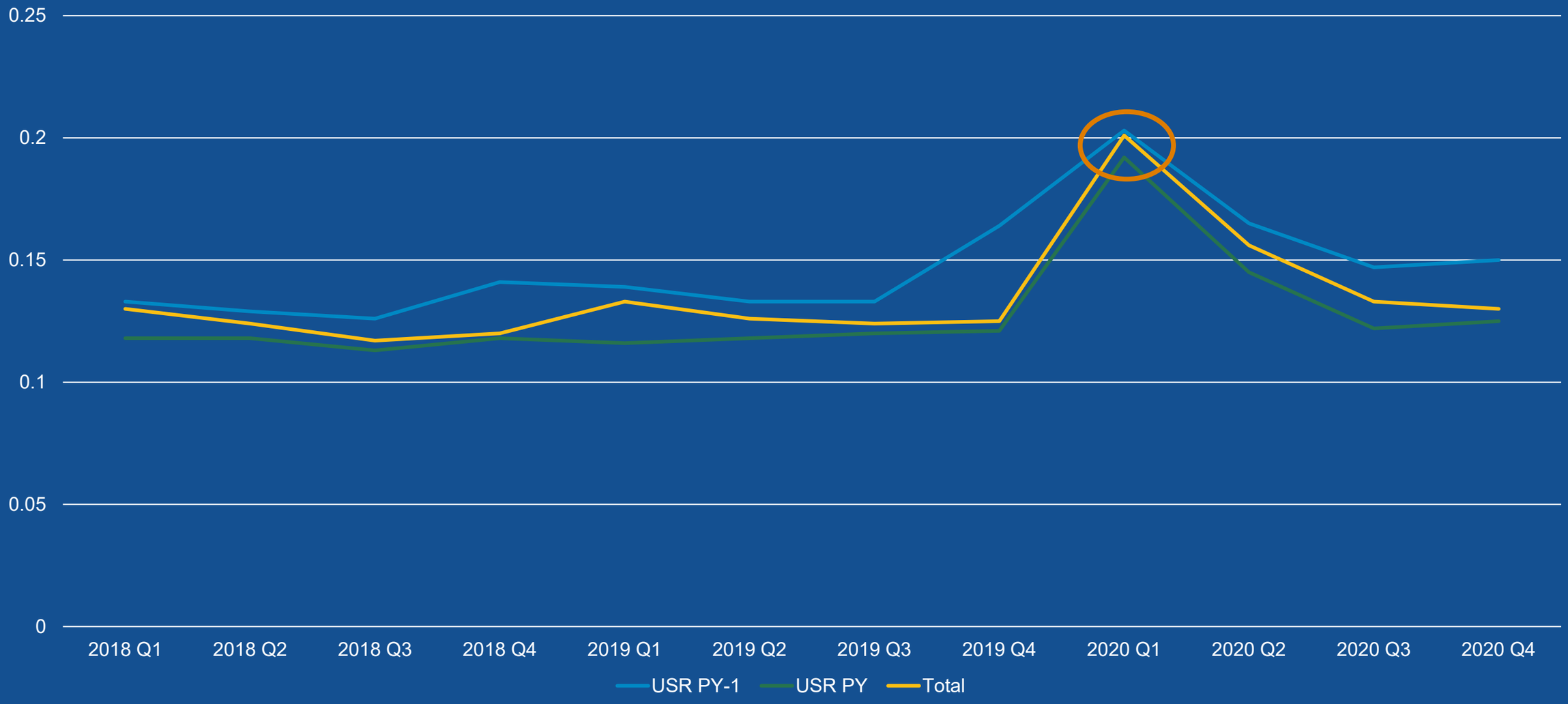
USR data from PY 1994-2019 Projected to Report Level 5

Changes in the CII for AY 2020

- Currently, the estimated change in the CII for AY 2020 based on claims from 2019 policies is one of the largest changes observed since the beginning of the model dataset in 1979
- Staff explored the changes in the CII by accident quarter (AQ) beginning with 2018 Q1
  - The shape of the curves for both the CII and the log difference in the CII are similar
  - The increase is concentrated in accident dates from 2020 Q1 and moderates somewhat throughout AY 2020
- Based on the changes, developed forecasts relying on alternative assumptions for comparison:
  - Recommended model with time series forecast for CII to project AY 2021-2024
  - Recommended model with forecast of no change for CII to project AY 2021-2024
  - Recommended model with time series forecast to project AY 2020-2024 (i.e., replace estimate for AY 2020 with forecast for AY 2020 for the purpose of forecasting AY 2021-2024)

CII by AQ for Prior PY portion, Current PY portion and Total AQ Data

As of Dec. 28, 2021



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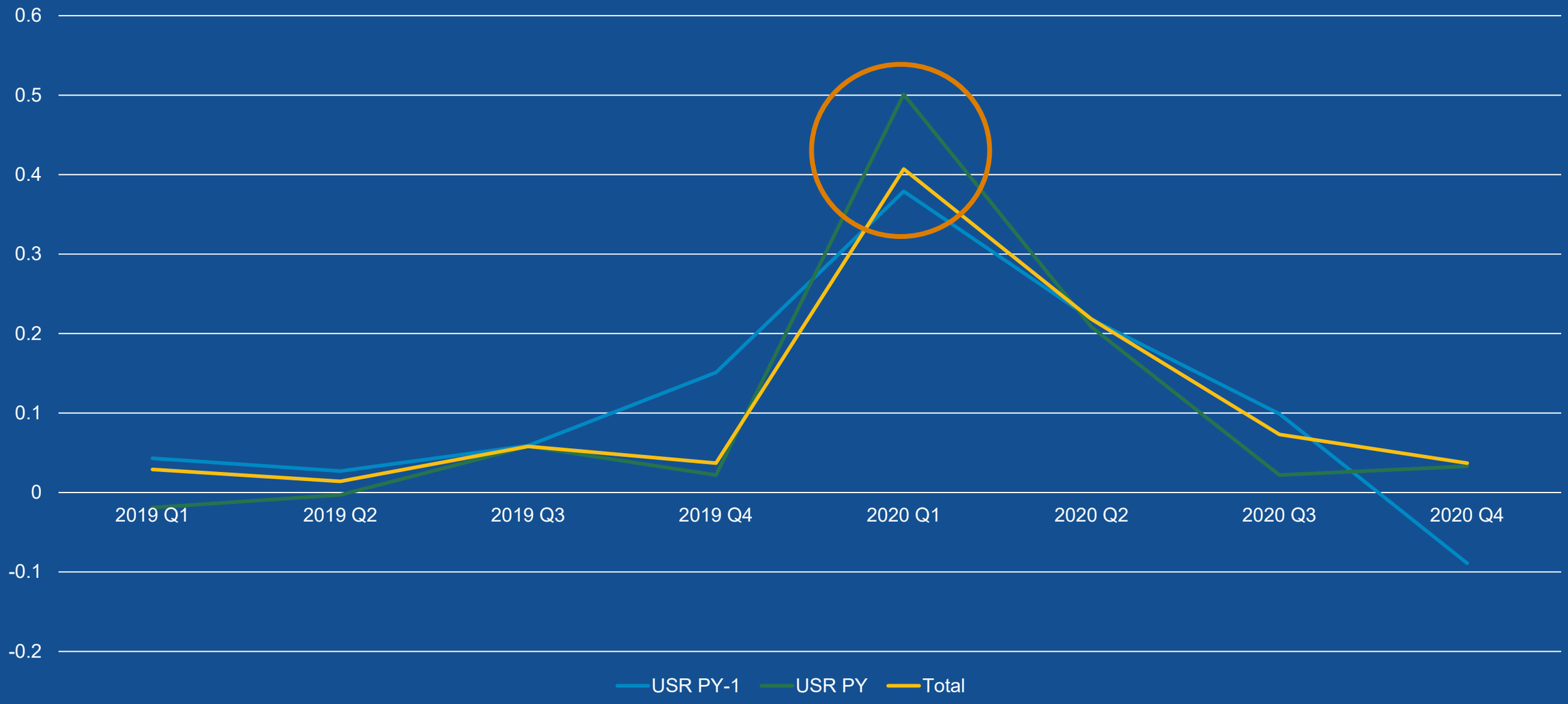
Source: PY 2018 – 2020 USR data at first report
For AY 2018, USR PY-1 represents the AY 2018 claims on 2019 policies. USR PY represents the AY 2018 claims on 2018 policies. Total represents all AY 2018 claims.

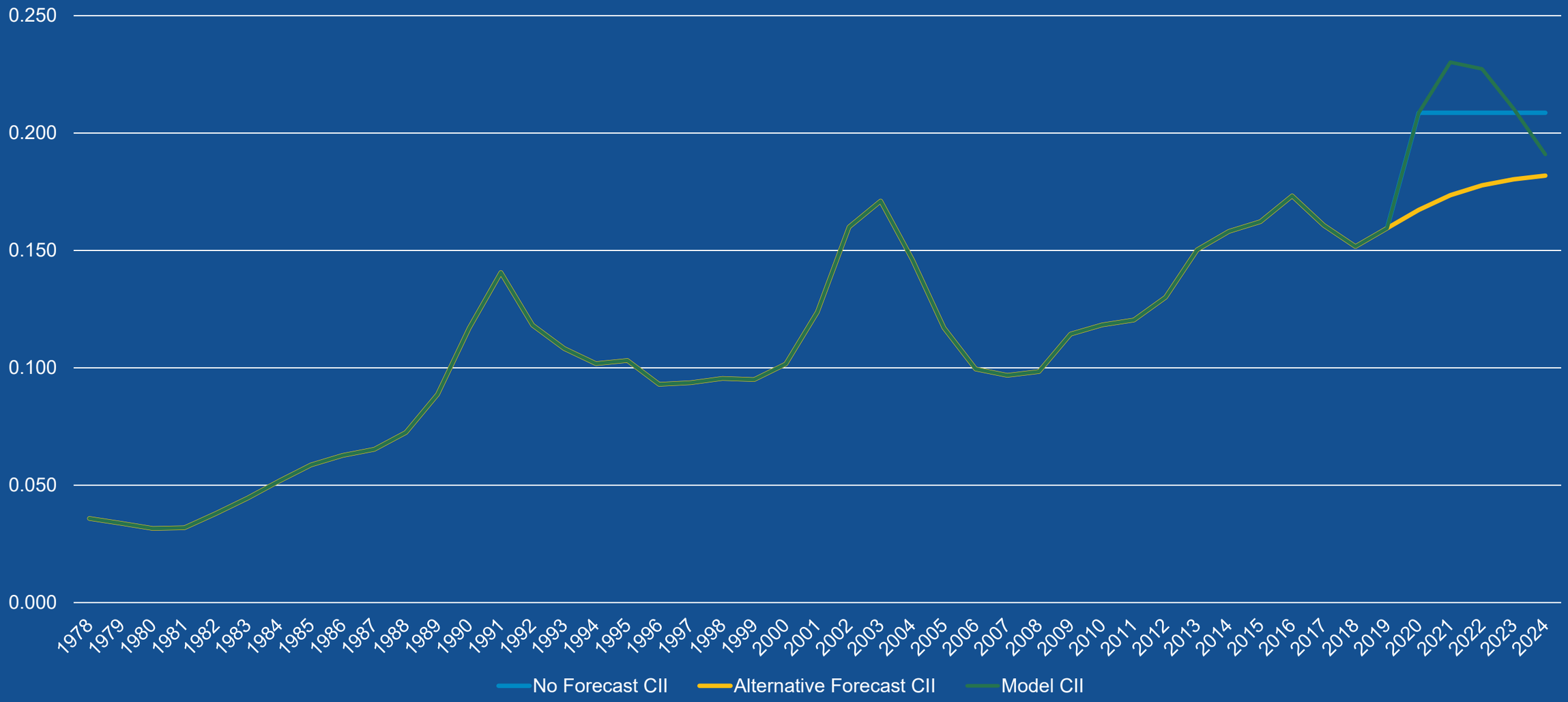
YoY Log Differences in the CII by AQ for Prior PY portion, Current PY portion and Total AQ Data

As of Dec. 28, 2021

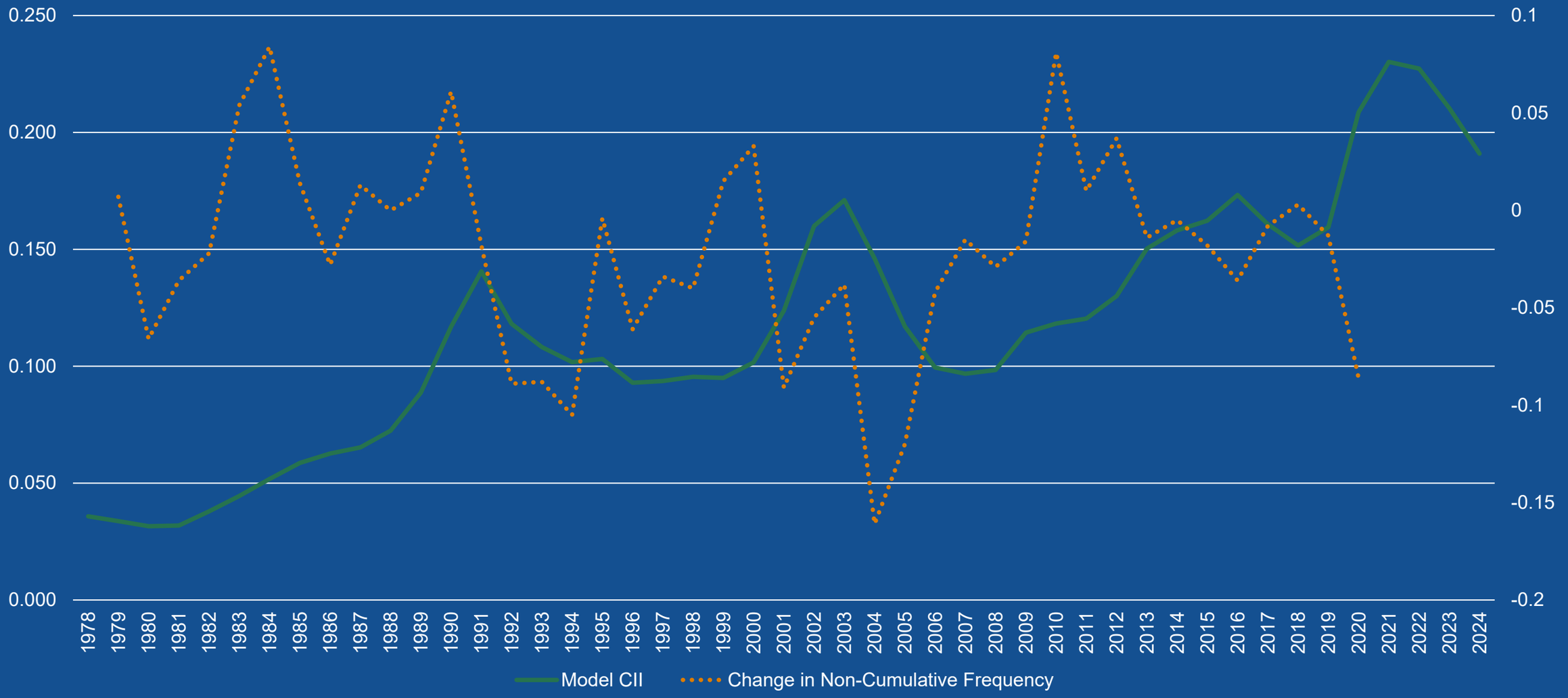


Source: PY 2018 – 2020 USR data at first report
For AY 2018, USR PY-1 represents the AY 2018 claims on 2019 policies. USR PY represents the AY 2018 claims on 2018 policies. Total represents all AY 2018 claims.

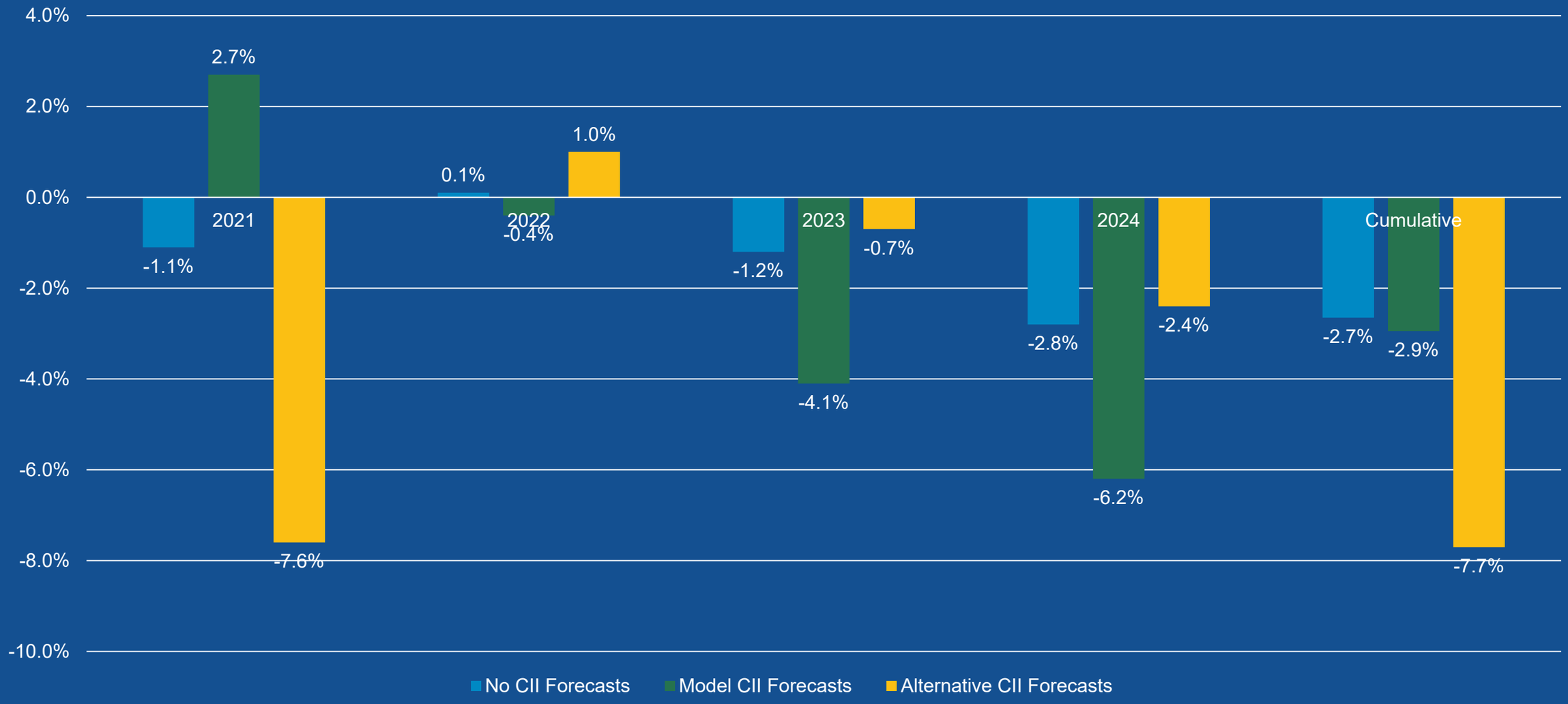
Comparison of CII projected using Recommended Model, Alternative Forecast and No Forecast



CII projected using Recommended Model vs. Changes in Non-Cumulative Frequency



Comparison of Projected Change in Frequency Under Alternative Assumptions



No CII Forecasts represents the projected change in frequency for AY 2021-2024 if we assume no change in the CII. Model CII Forecasts represents the projected change in frequency for AY 2021-2024 if we assume the change in the CII based on the time series model. Alternative CII Forecasts represents the projected change in frequency for AY 2021-2024 if we project forward from AY 2019 without including the partial AY 2020 in the projection. The change in AY 2021 for each is calculated as the forecasted AY 2021 frequency less the current estimate of AY 2020 indemnity frequency based on partial year change.

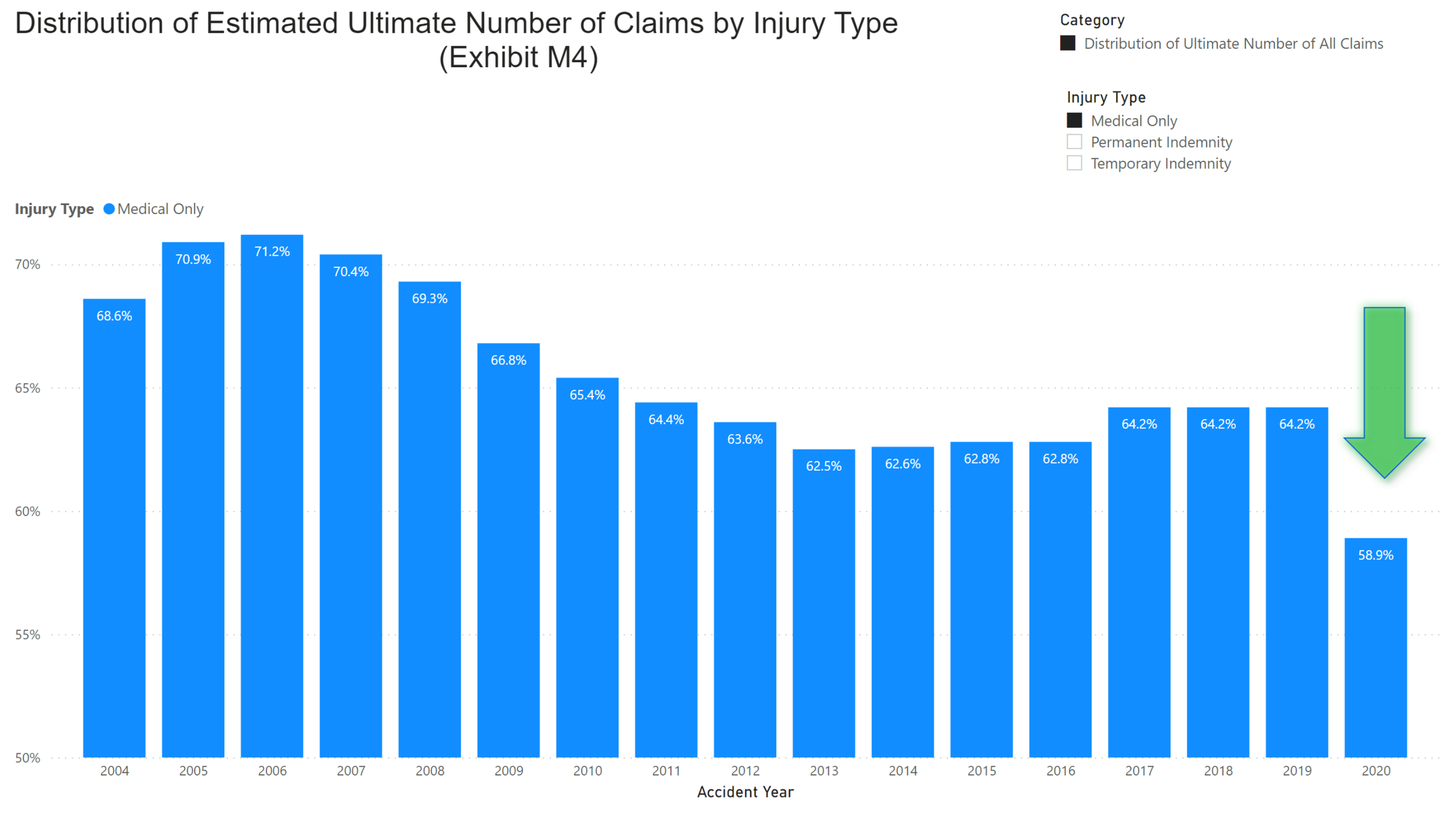
Preliminary Staff Recommendations for Frequency Model Projection

- Project the indemnity claim frequency changes for AY 2021-2024 using the recommended model from the December Committee meeting
  - Use the forecasted CII based on the time series model to project the model frequency changes
  - Average the model frequency change for AY 2021 with the estimate based on the aggregate data
  - As part of the trending alternatives, review the projected frequency change with the predictions for AY 2022-2024 adjusted based on the significant difference between the model estimate for AY 2021 and the estimate based on the initial aggregate emergence

05

First Quarter 2022 Review of Diagnostics

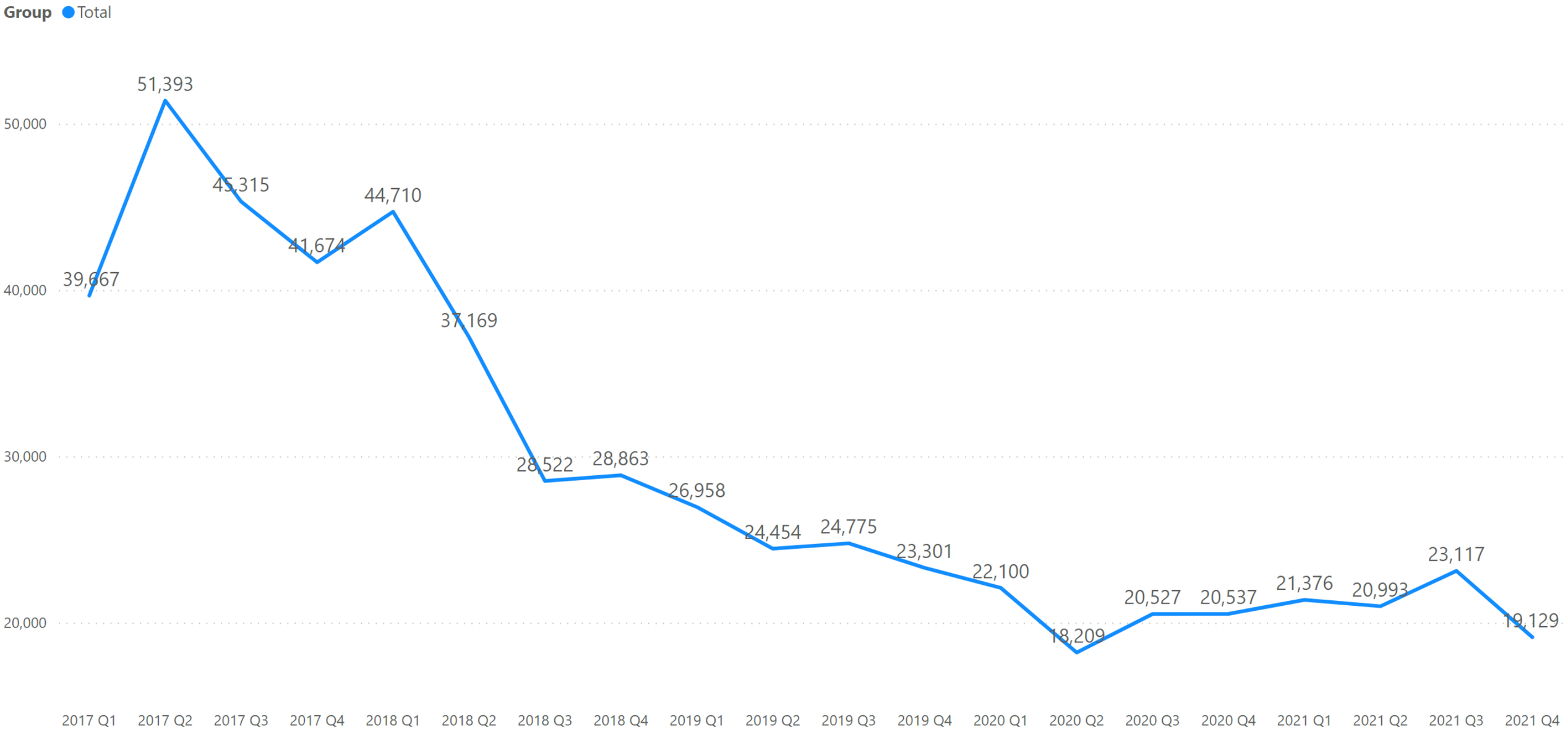
Distribution of Estimated Ultimate Number of Claims by Injury Type (Exhibit M4)



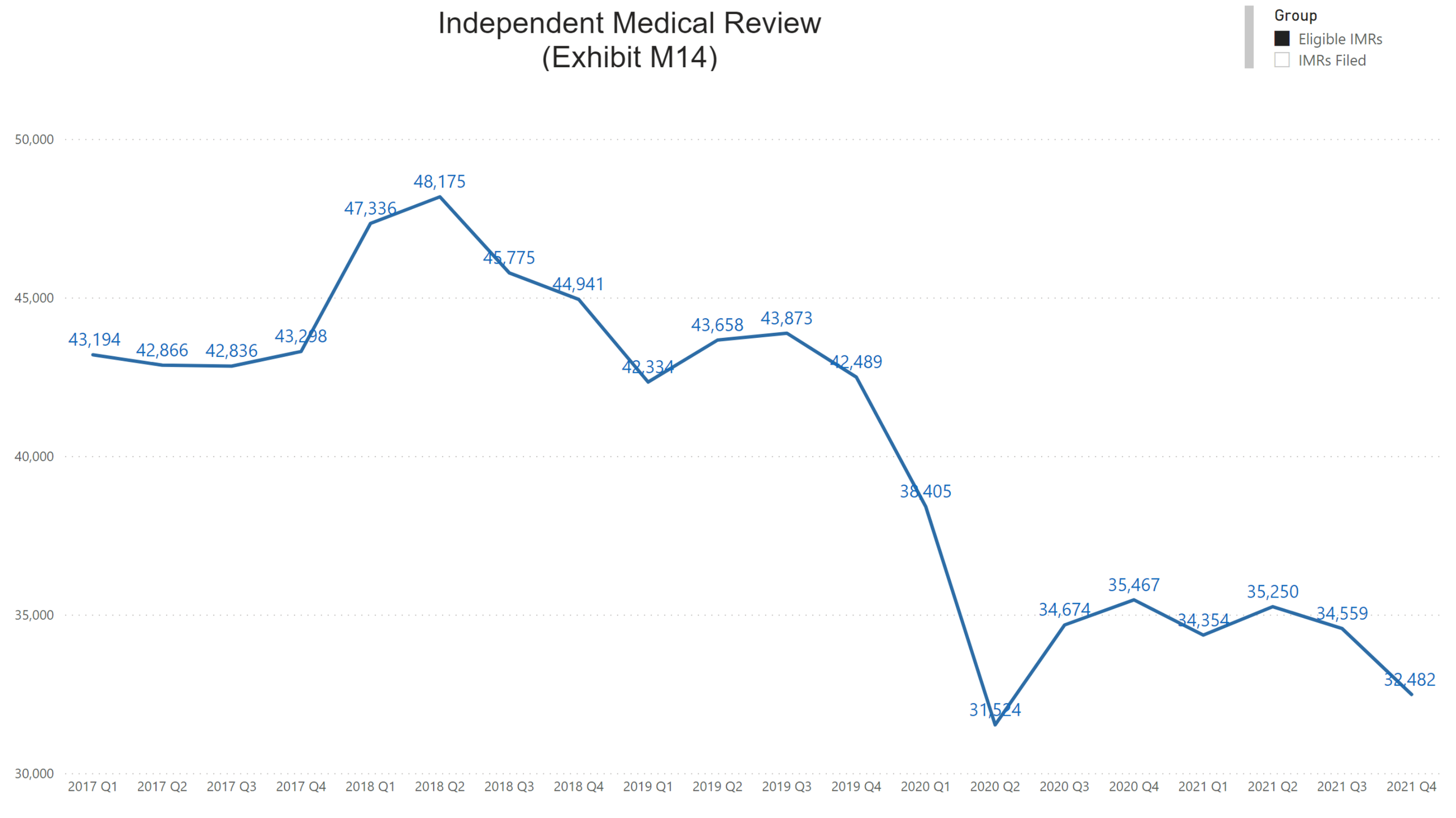
Filed Lien Counts
(Exhibit M9.2)

Group
Total

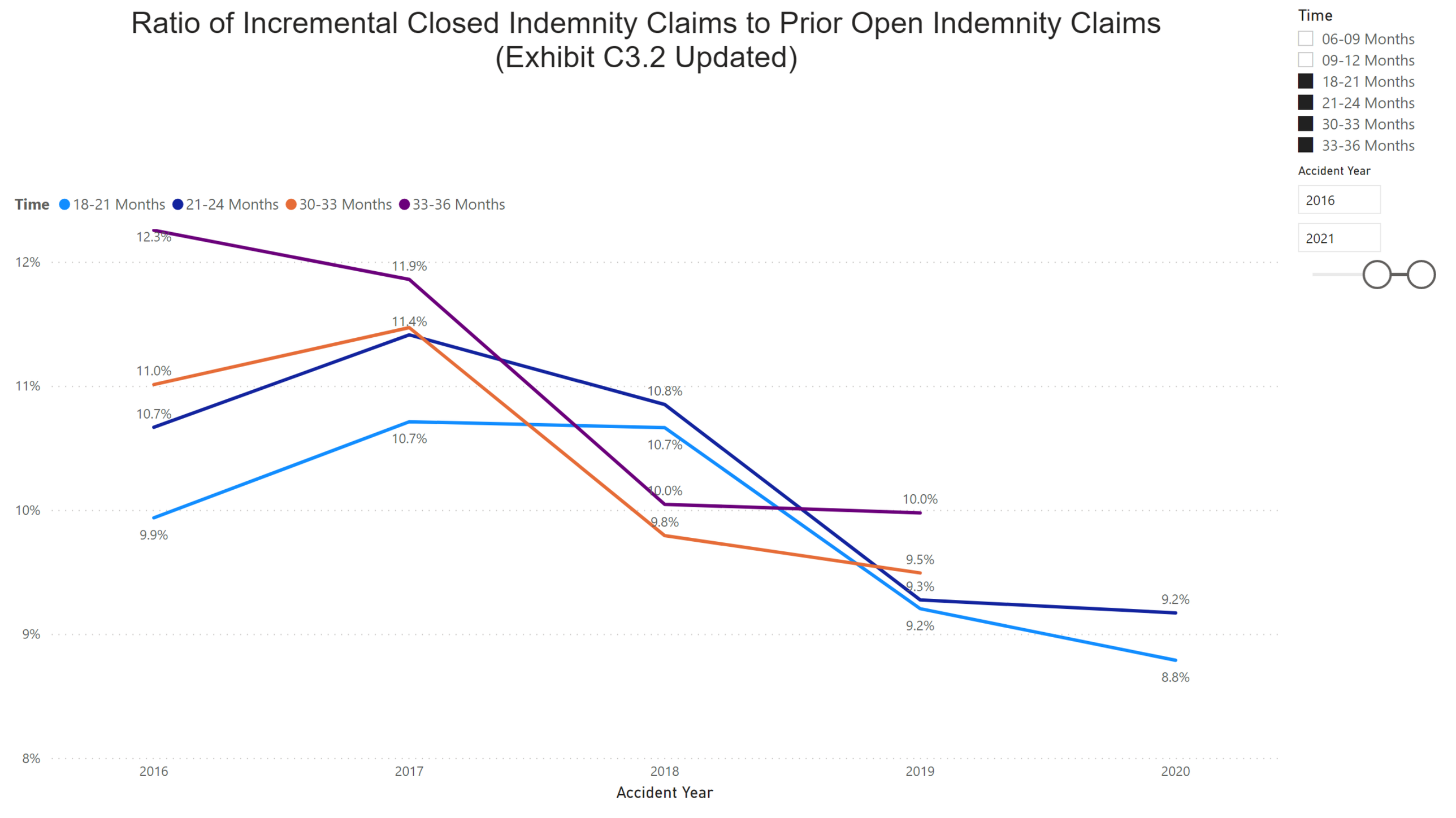
2017 2021



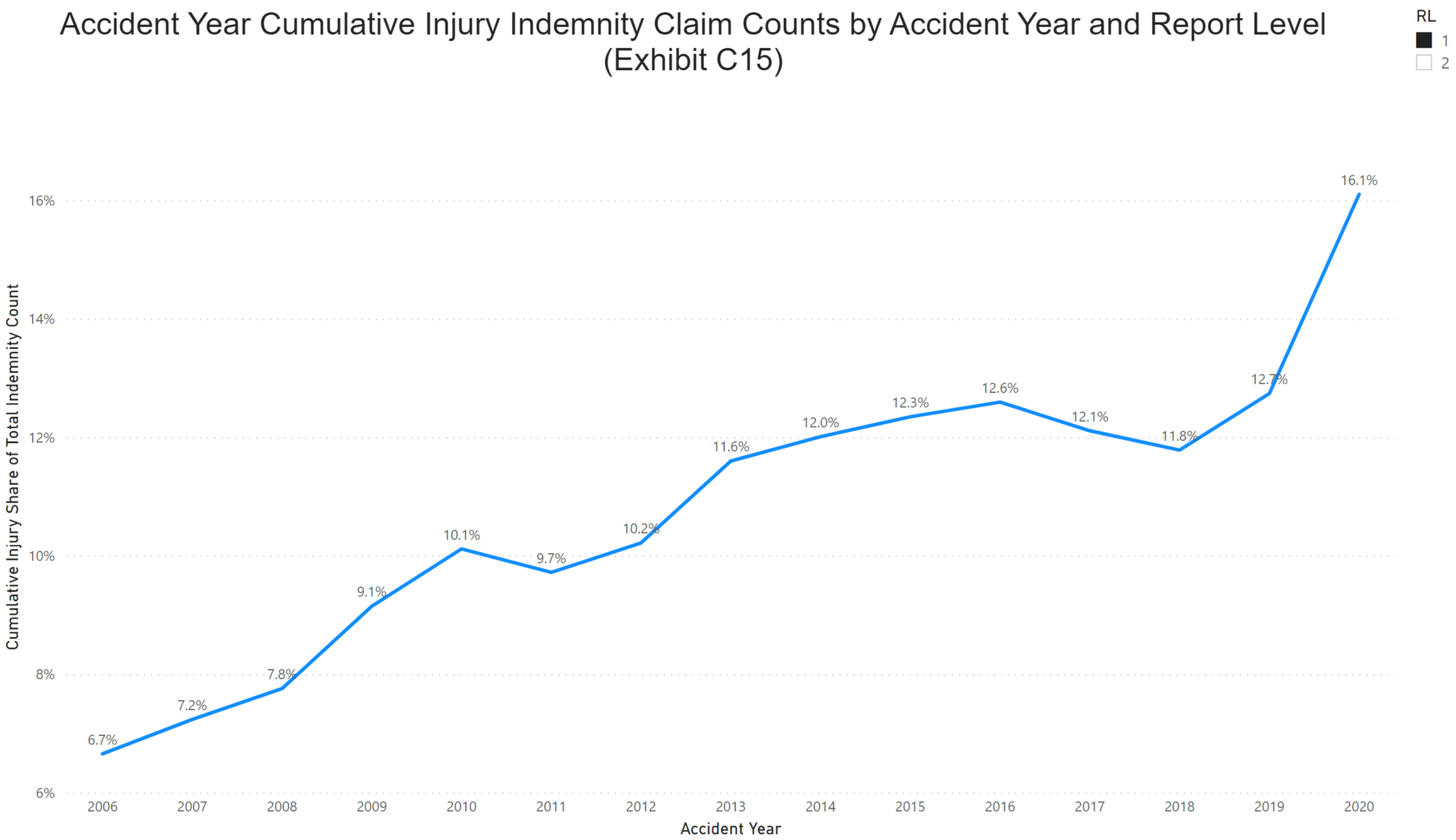
Independent Medical Review (Exhibit M14)



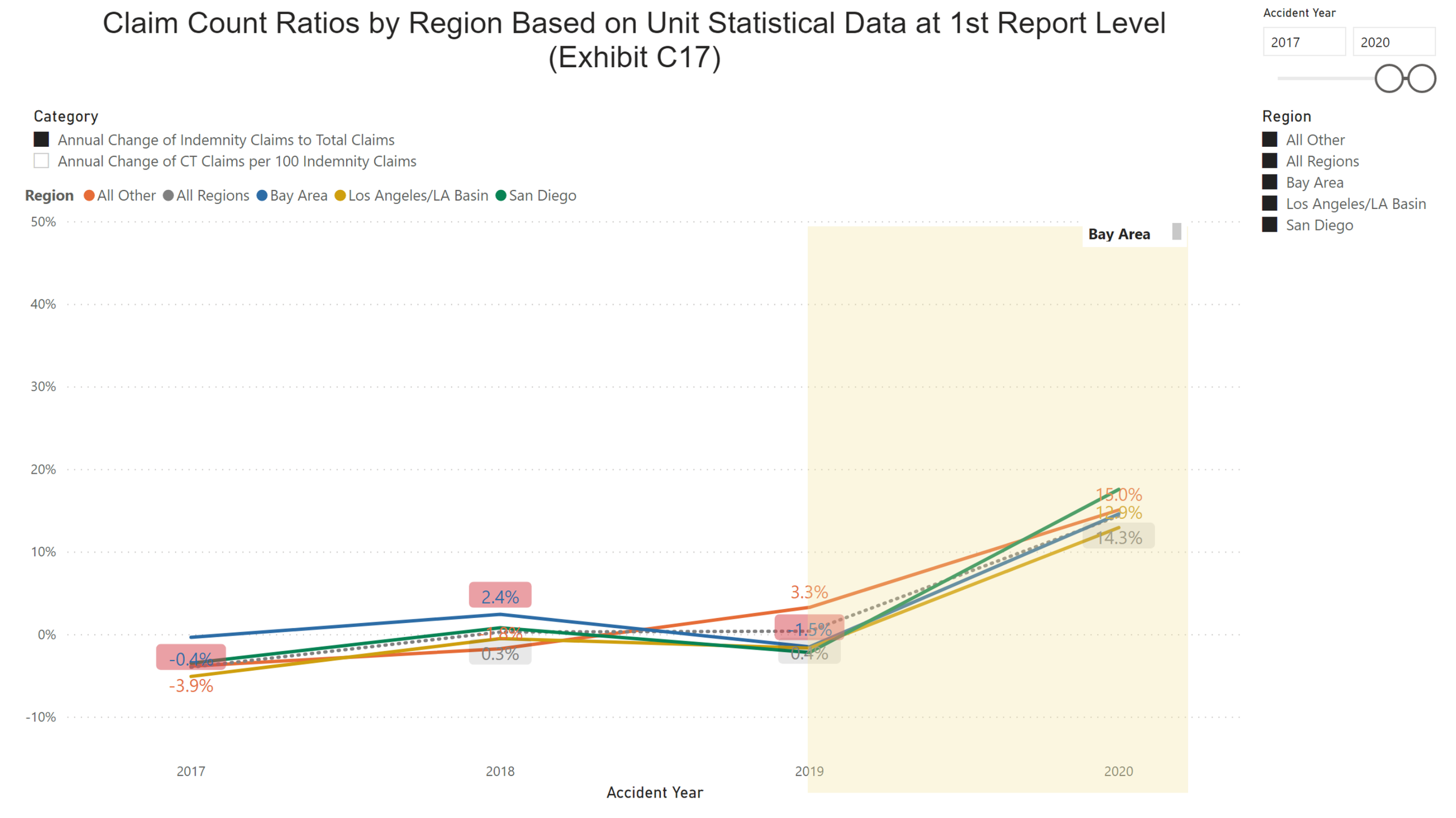
Ratio of Incremental Closed Indemnity Claims to Prior Open Indemnity Claims (Exhibit C3.2 Updated)



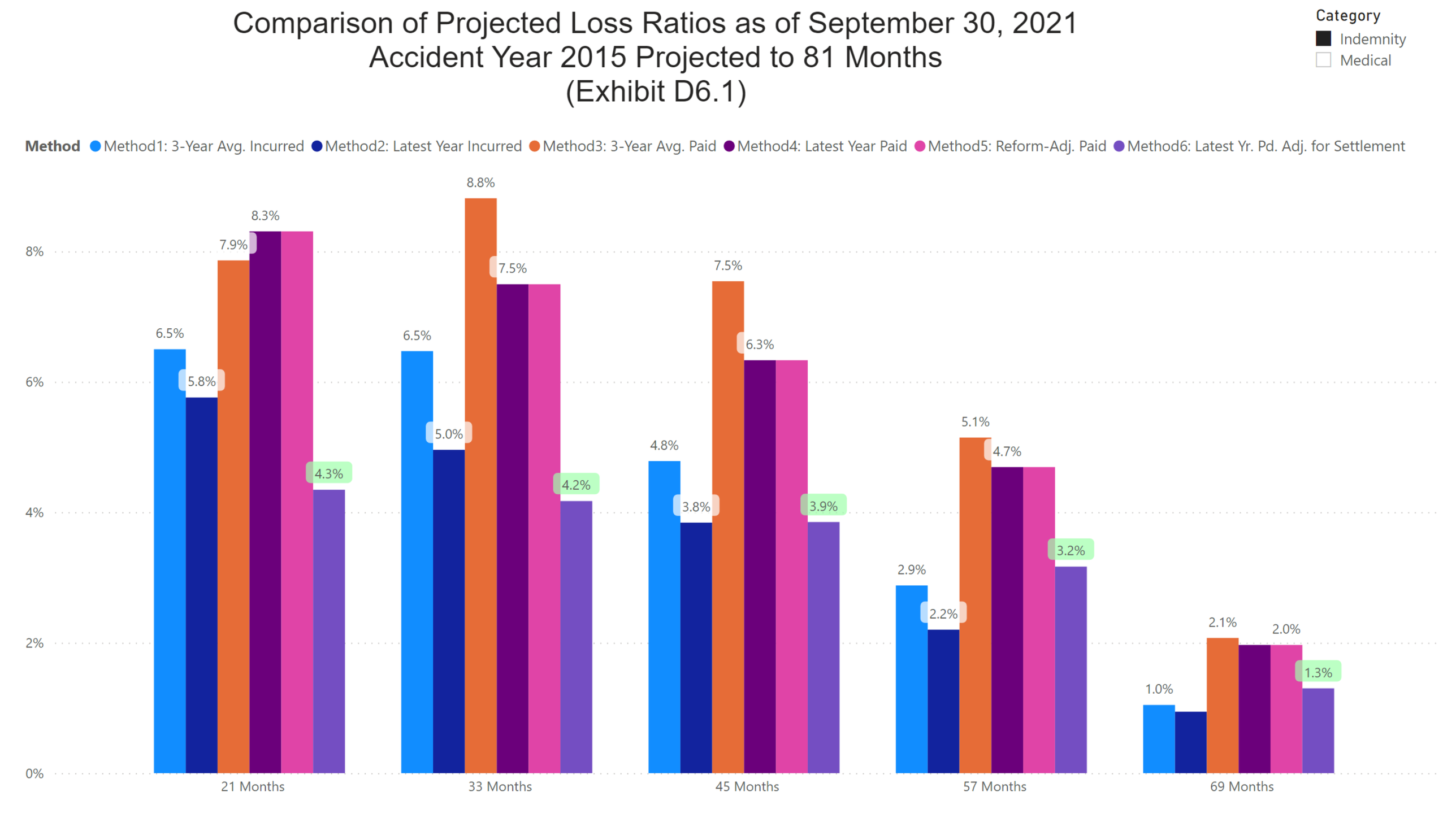
Accident Year Cumulative Injury Indemnity Claim Counts by Accident Year and Report Level (Exhibit C15)



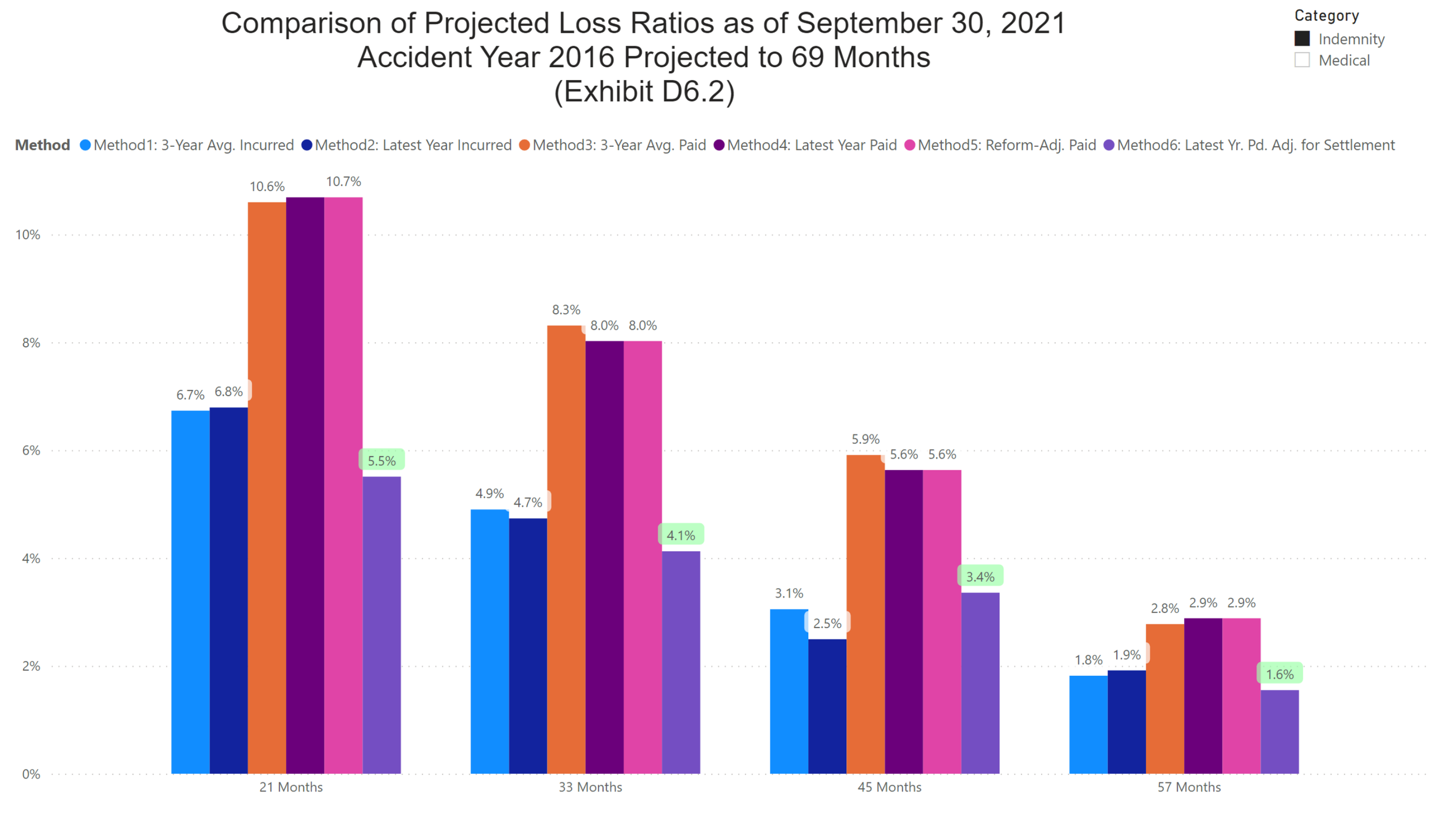
Claim Count Ratios by Region Based on Unit Statistical Data at 1st Report Level (Exhibit C17)



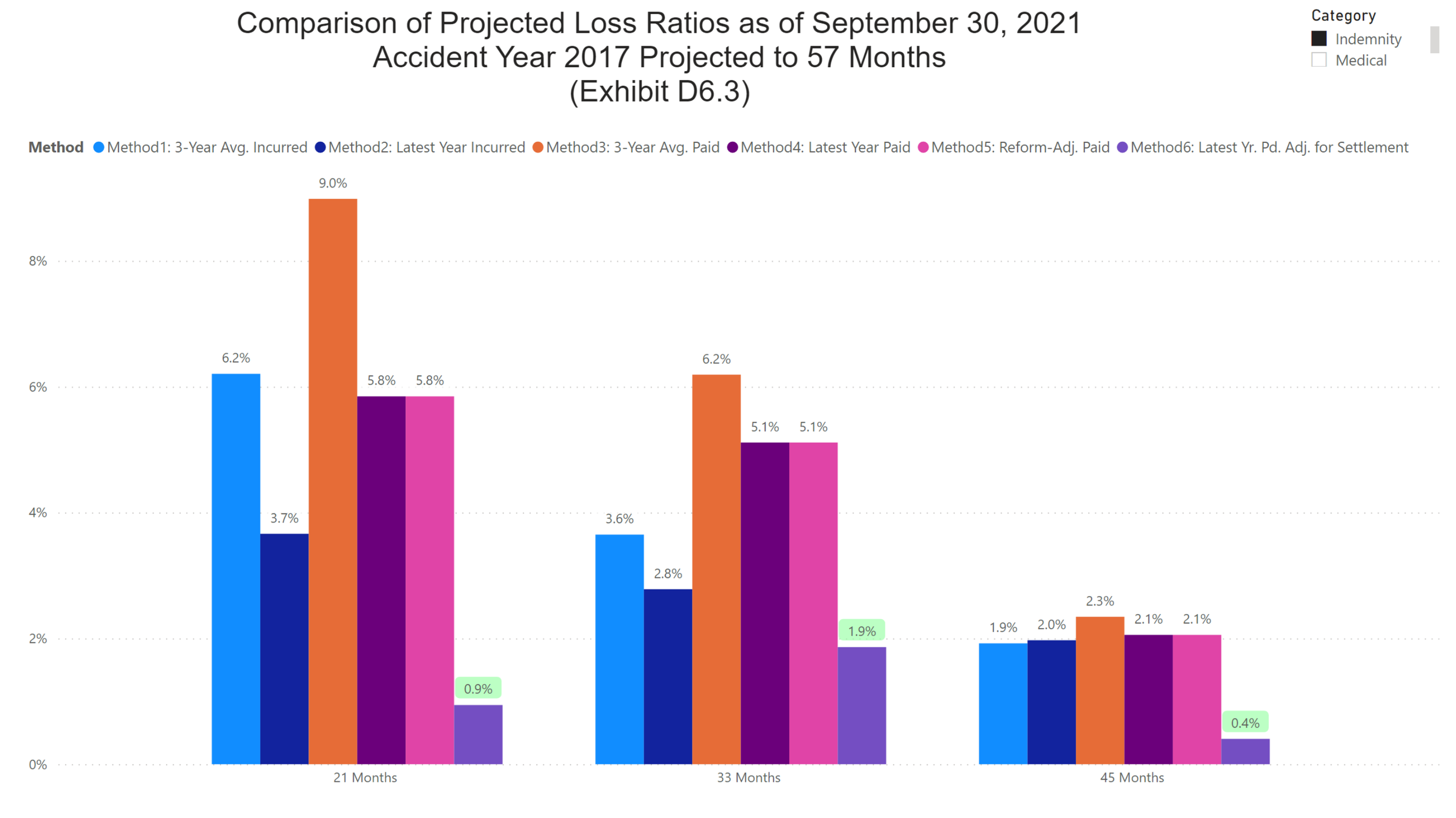
Comparison of Projected Loss Ratios as of September 30, 2021
Accident Year 2015 Projected to 81 Months
(Exhibit D6.1)



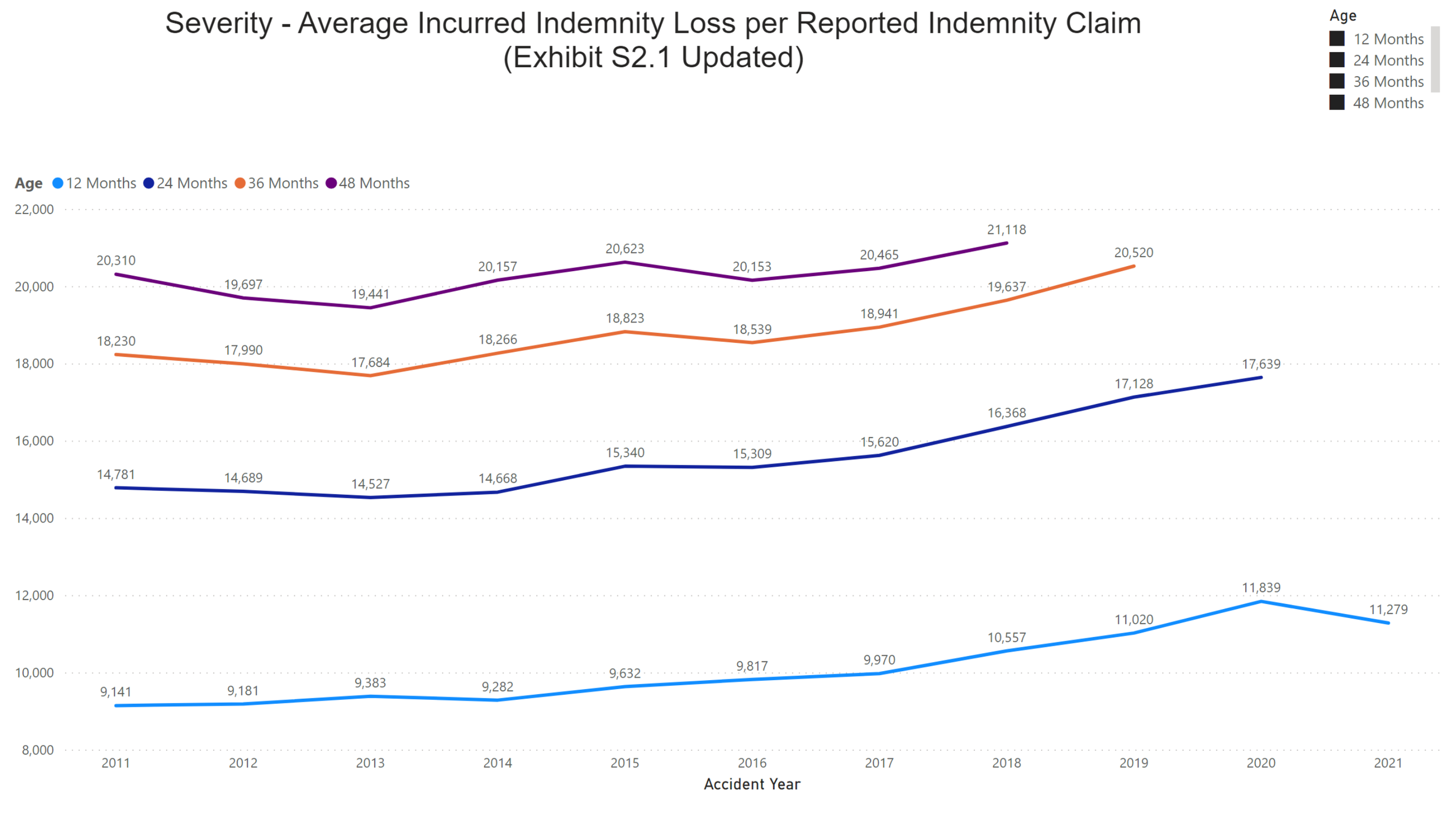
Comparison of Projected Loss Ratios as of September 30, 2021
Accident Year 2016 Projected to 69 Months
(Exhibit D6.2)



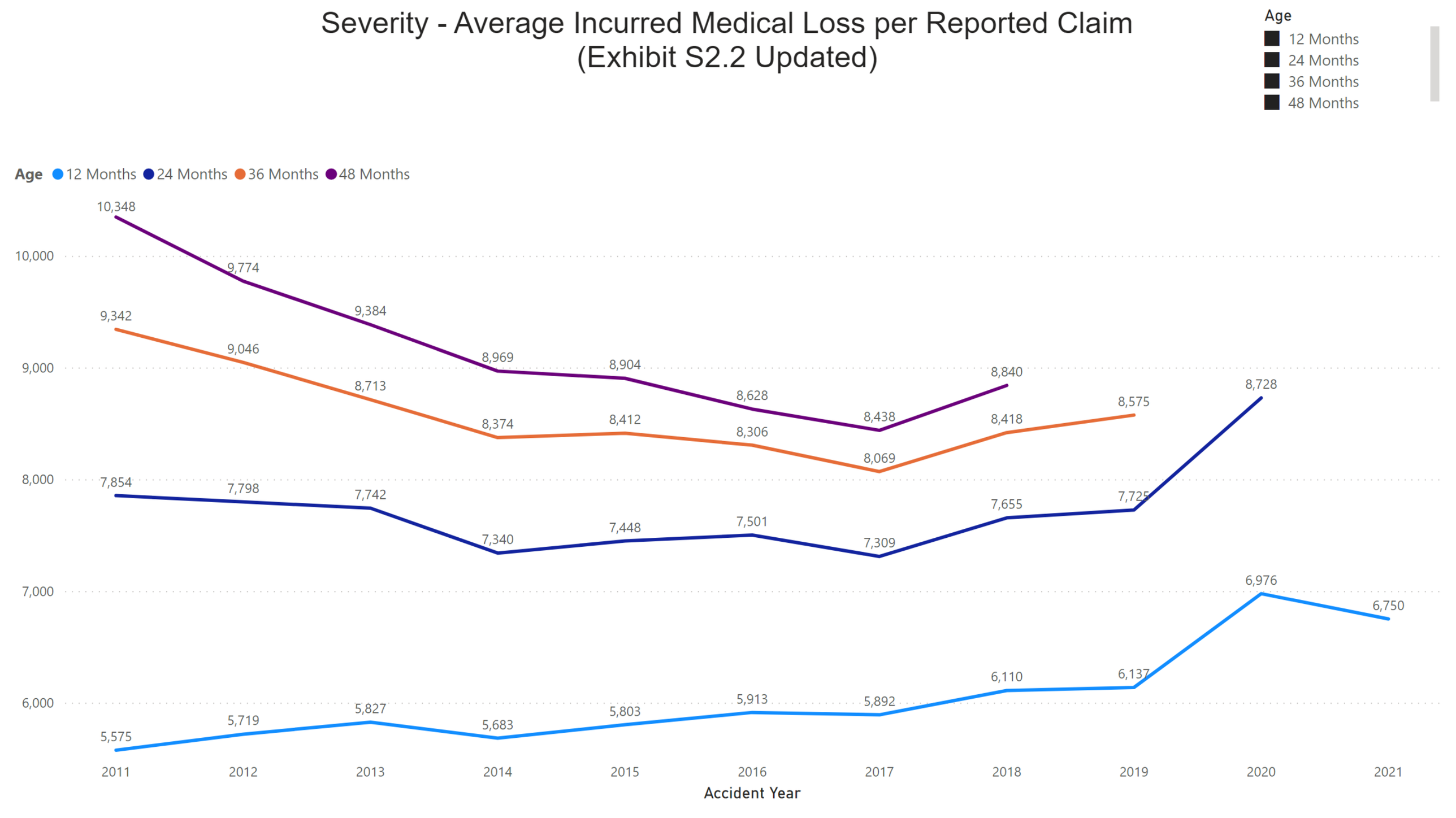
Comparison of Projected Loss Ratios as of September 30, 2021
Accident Year 2017 Projected to 57 Months
(Exhibit D6.3)



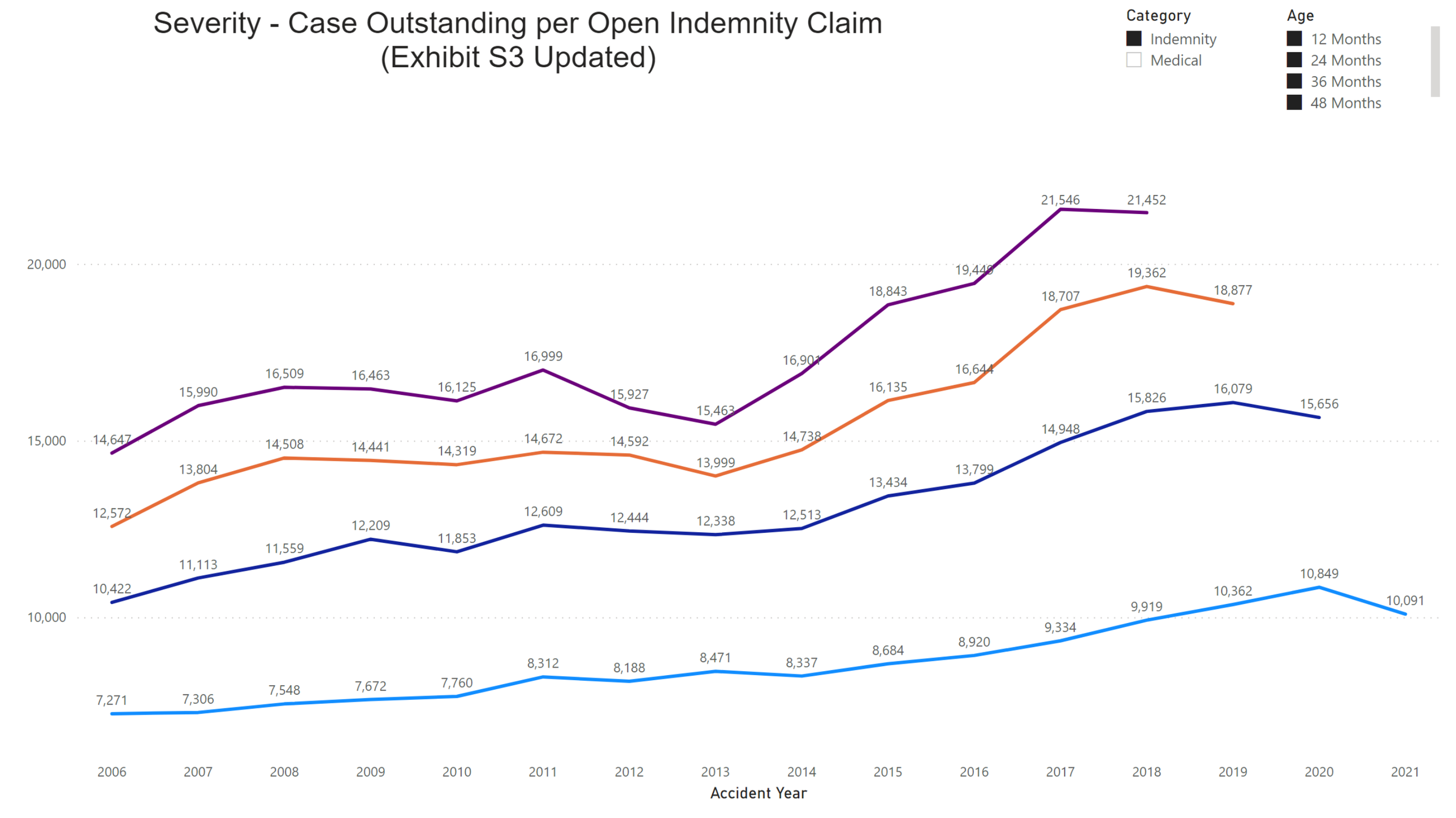
Severity - Average Incurred Indemnity Loss per Reported Indemnity Claim (Exhibit S2.1 Updated)



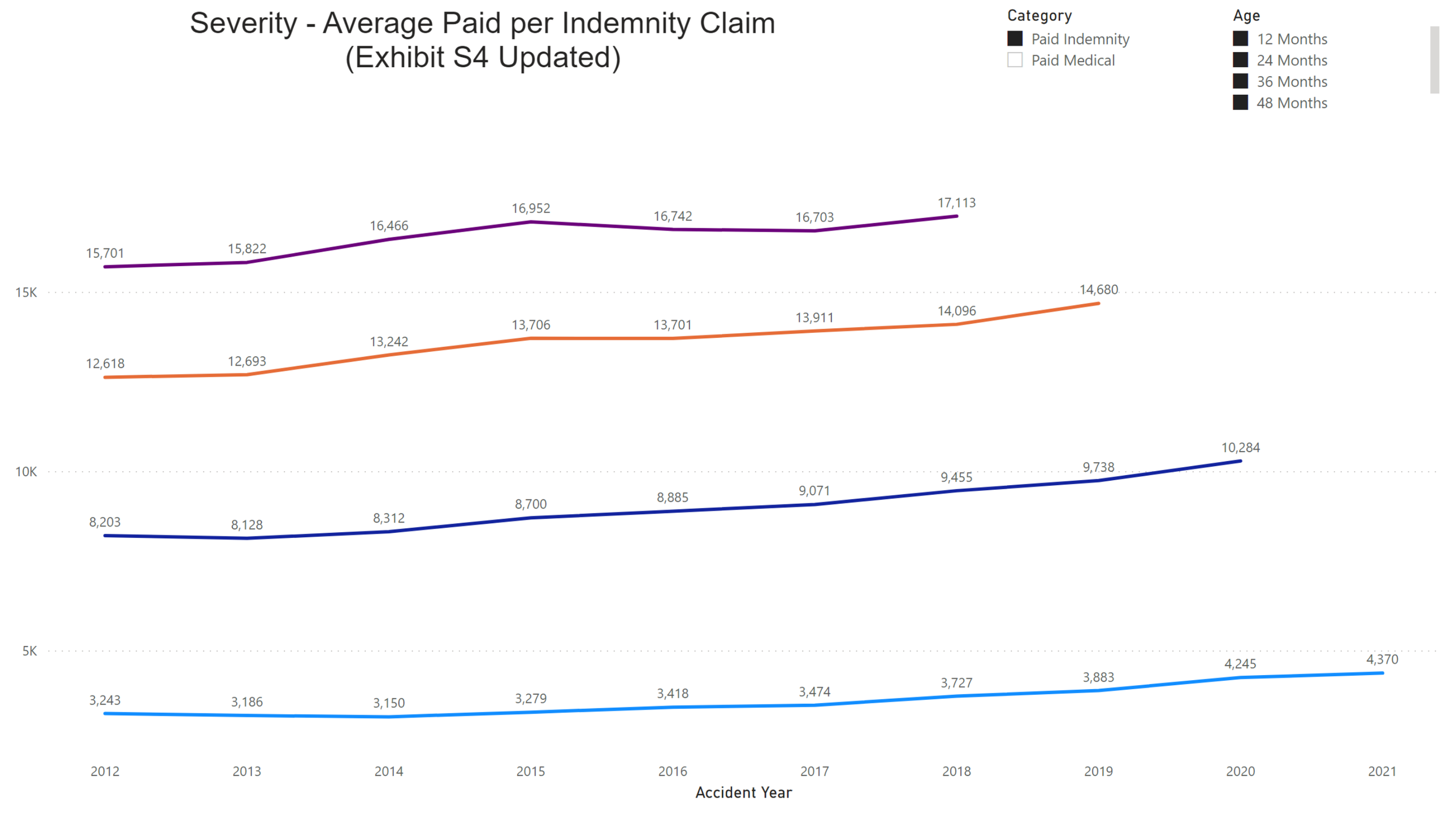
Severity - Average Incurred Medical Loss per Reported Claim (Exhibit S2.2 Updated)



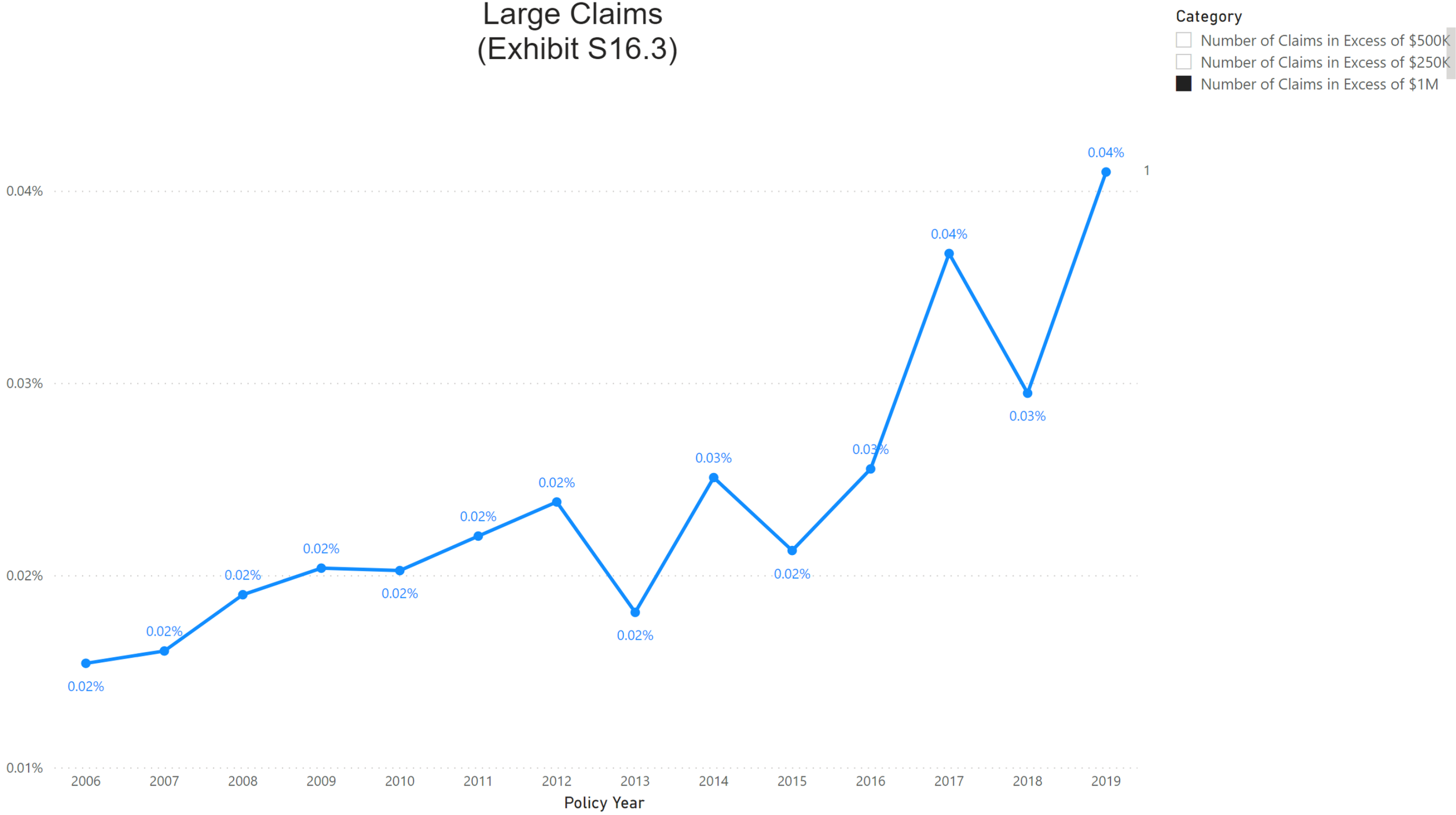
Severity - Case Outstanding per Open Indemnity Claim (Exhibit S3 Updated)



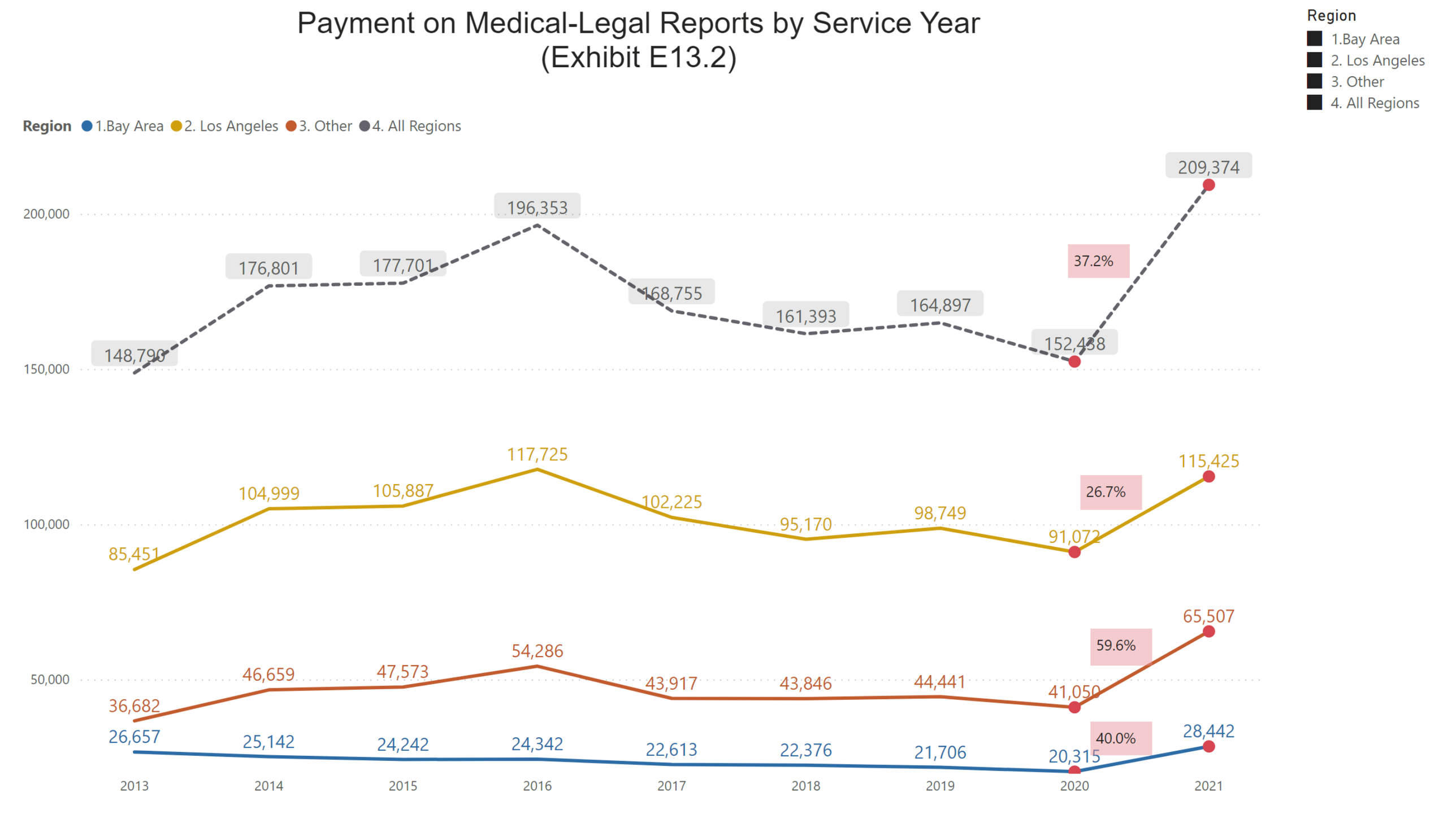
Severity - Average Paid per Indemnity Claim (Exhibit S4 Updated)



Large Claims
(Exhibit S16.3)



Payment on Medical-Legal Reports by Service Year (Exhibit E13.2)



06

12/31/2021 Experience Review

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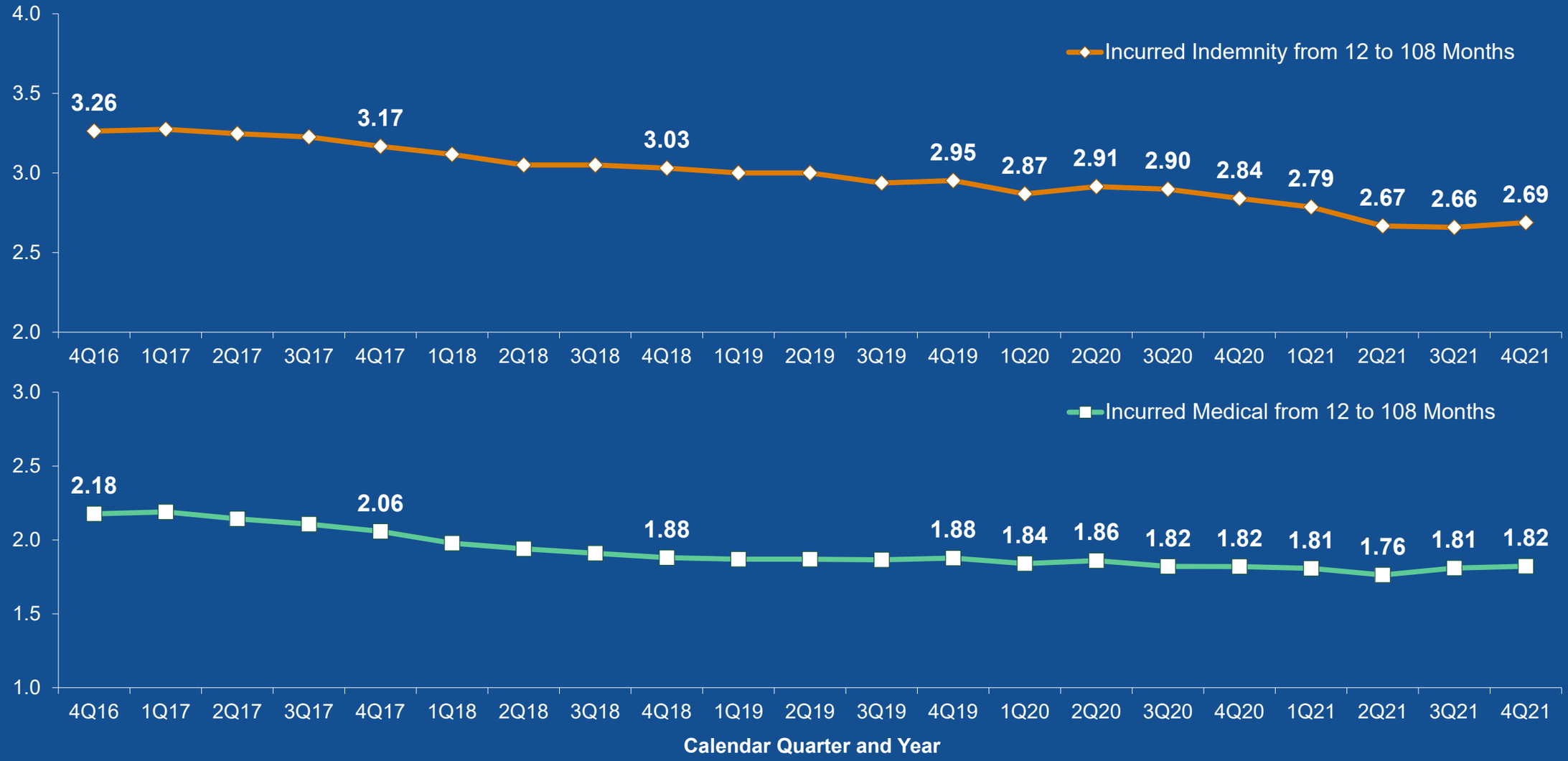
Summary of 12/31/2021 Experience (Excluding COVID-19)

- Almost 100% of market included
- Summary:
  - Paid loss development generally increasing at early periods but flat at later periods
  - 12-month 2021 claim settlement rate up over 2020 but older years continuing to decline
  - 12-month 2021 non-COVID-19 claim frequency up sharply over 2020
  - 2021 non-COVID-19 on-level severities decreasing from 2020
- Includes adjustments to loss development and on-leveling for 2021 medical fee schedule changes
- Areas to address for 9/1/2022 Filing:
  - Loss development projection
  - Economic changes impacting wage level and claim frequency
  - Premium measures as a basis for AYs 2020 and 2021
  - Frequency trend projections
  - Severity trend projections
  - Years to use as basis for 9/1/2022 loss ratio projection
  - Updated review of medical fee schedule changes

Cumulative Incurred Development from 12 to 108 Months

As of December 31, 2021



WCIRB California™
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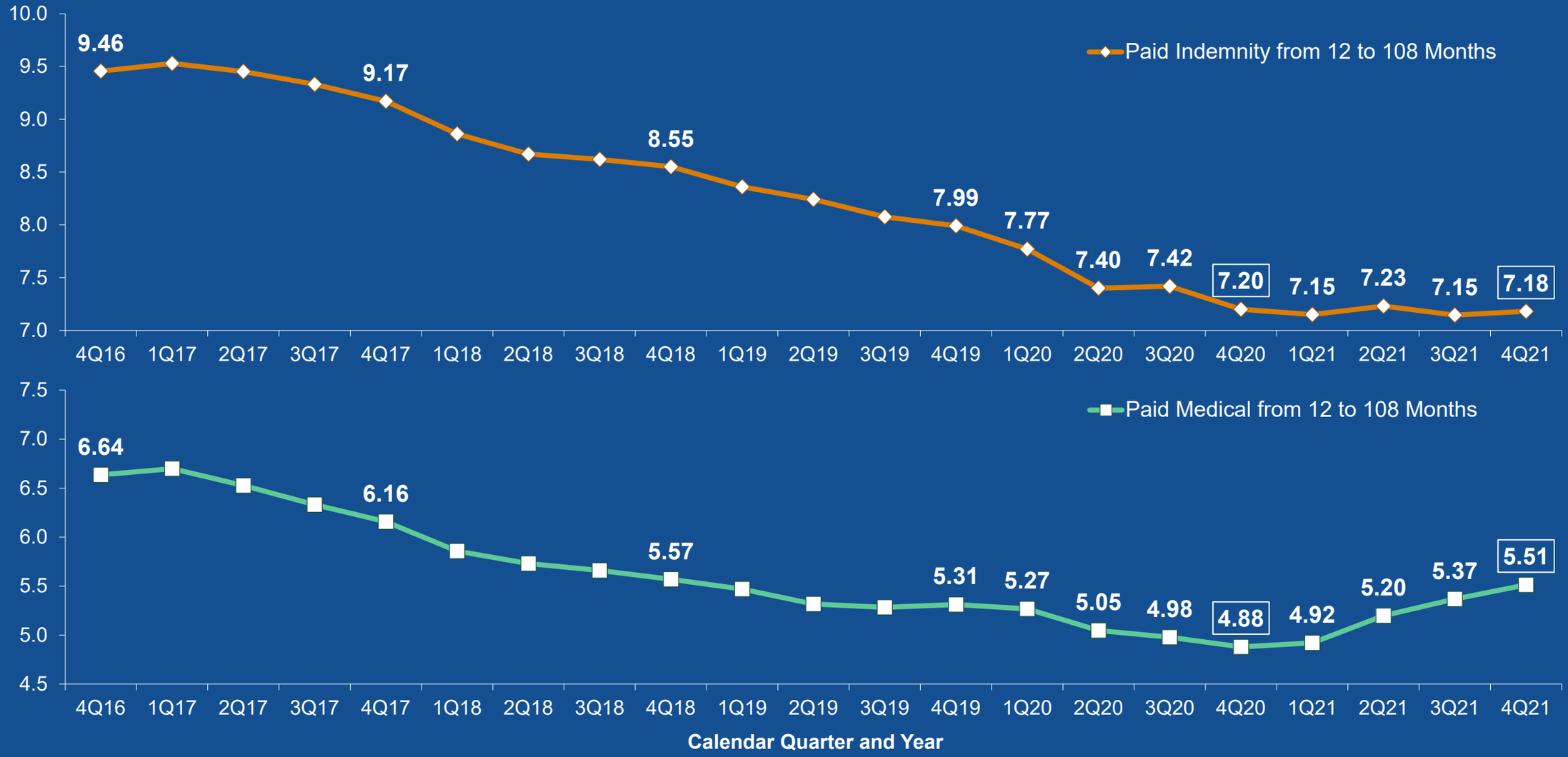
Source: WCIRB Aggregate Financial Data

Cumulative Paid Development from 12 to 108 Months

As of December 31, 2021

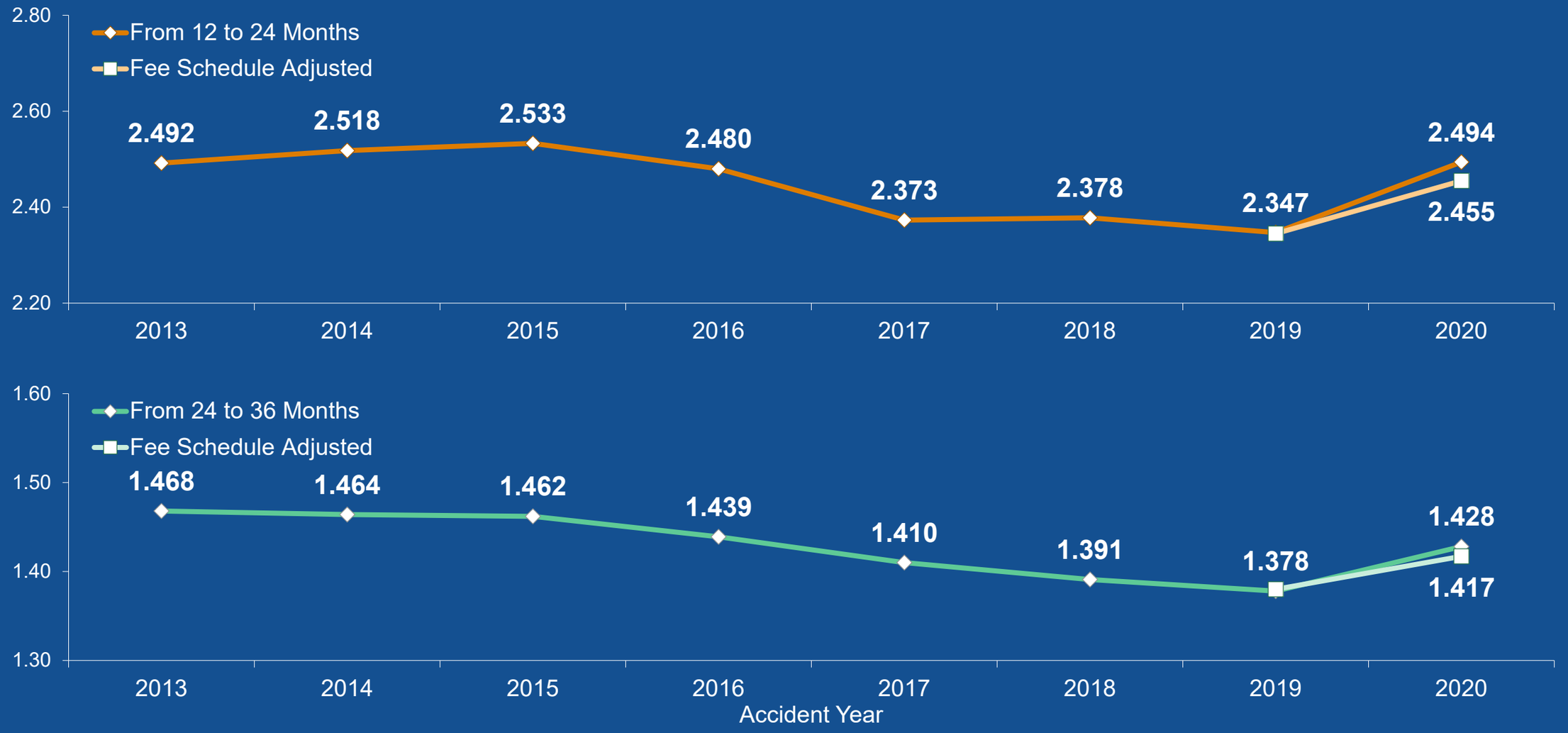


WCIRB California™
Objective. Trusted. Integral.

Source: WCIRB Aggregate Financial Data

Paid Medical Development (Exhibit 2.4.1)

As of December 31, 2021



WCIRB California™
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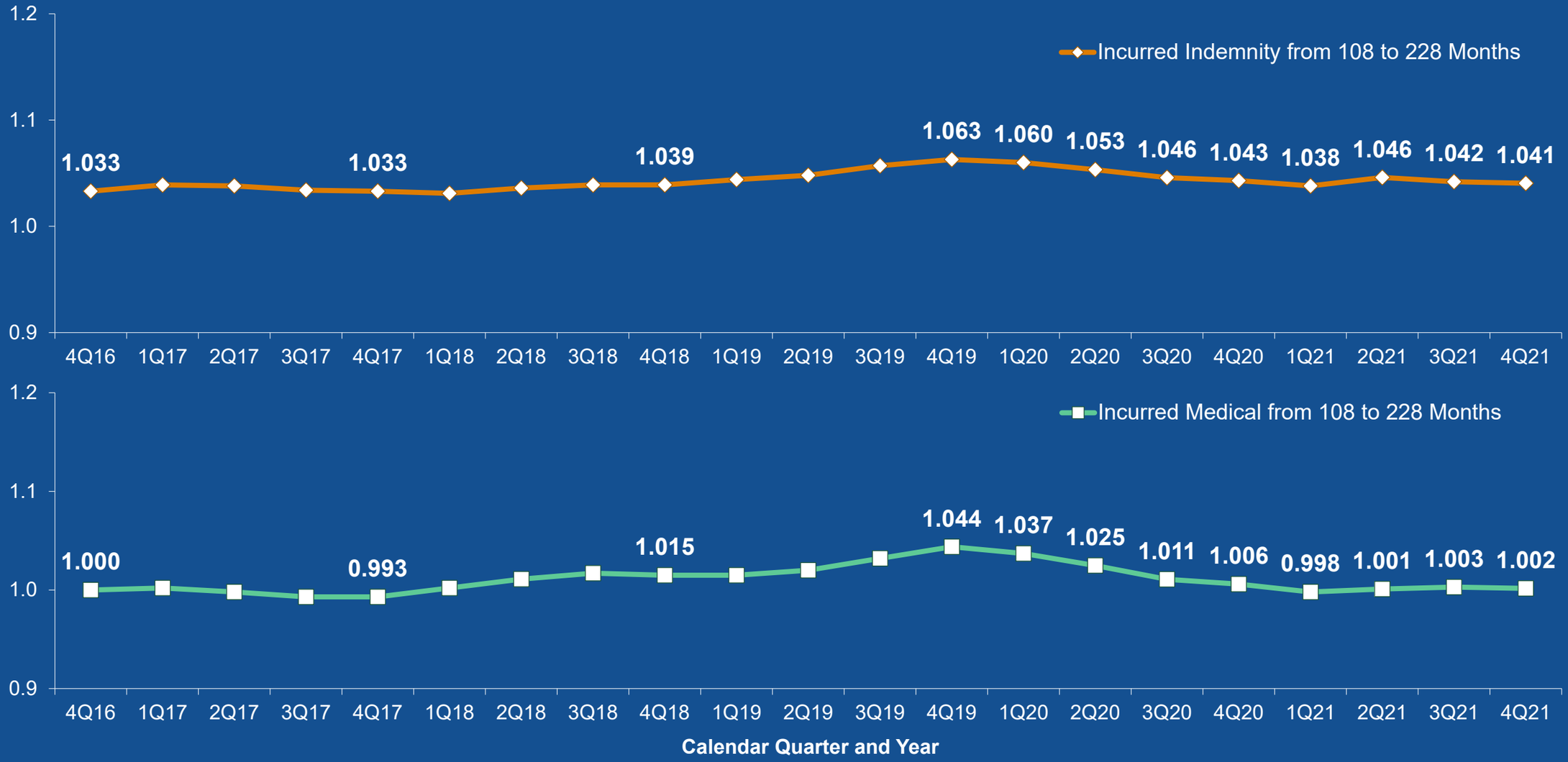
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims

Cumulative Incurred Development from 108 to 228 Months

As of December 31, 2021



WCIRB California™
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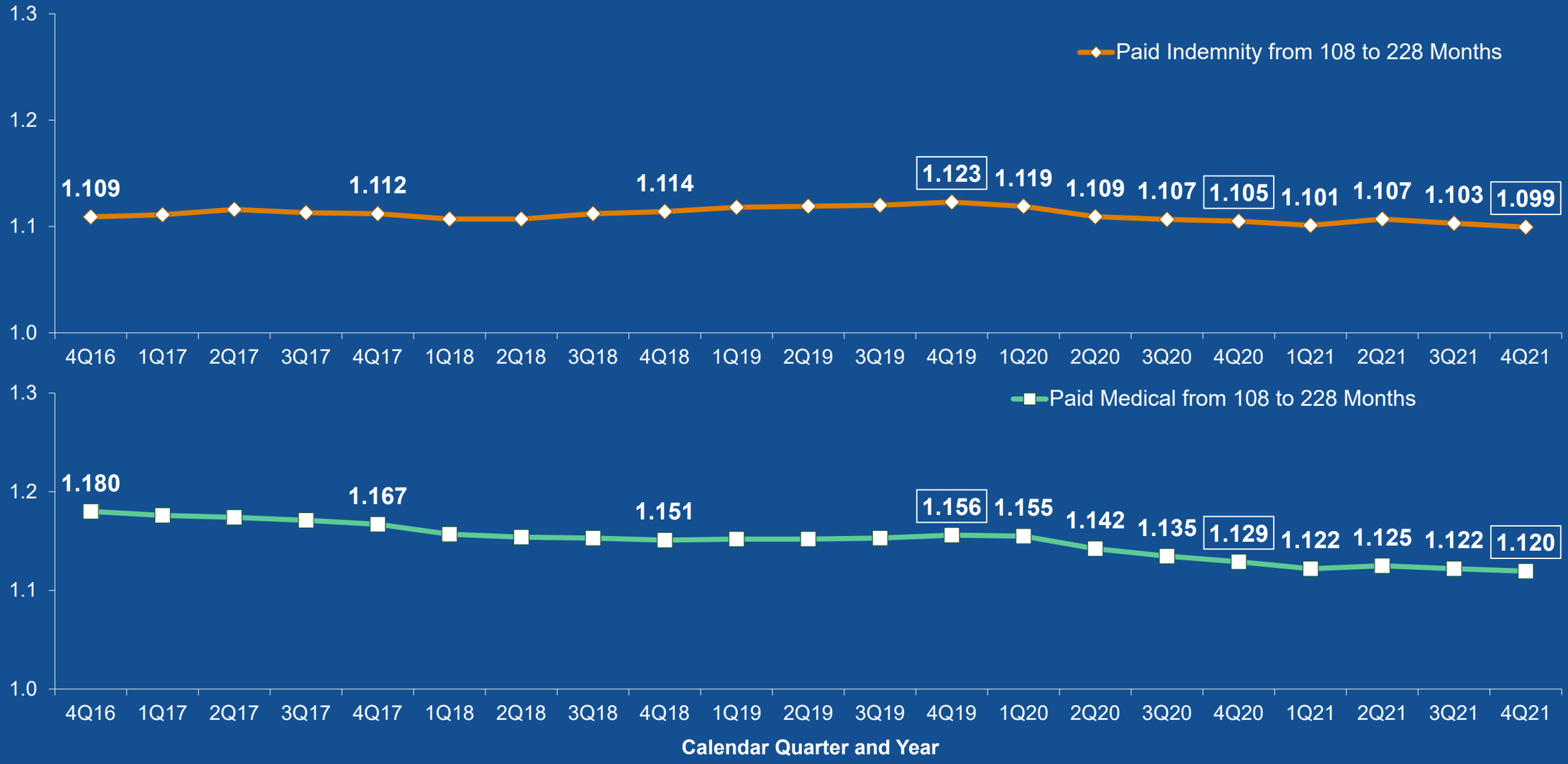
Source: WCIRB Aggregate Financial Data

Cumulative Paid Development from 108 to 228 Months

As of December 31, 2021



WCIRB California™
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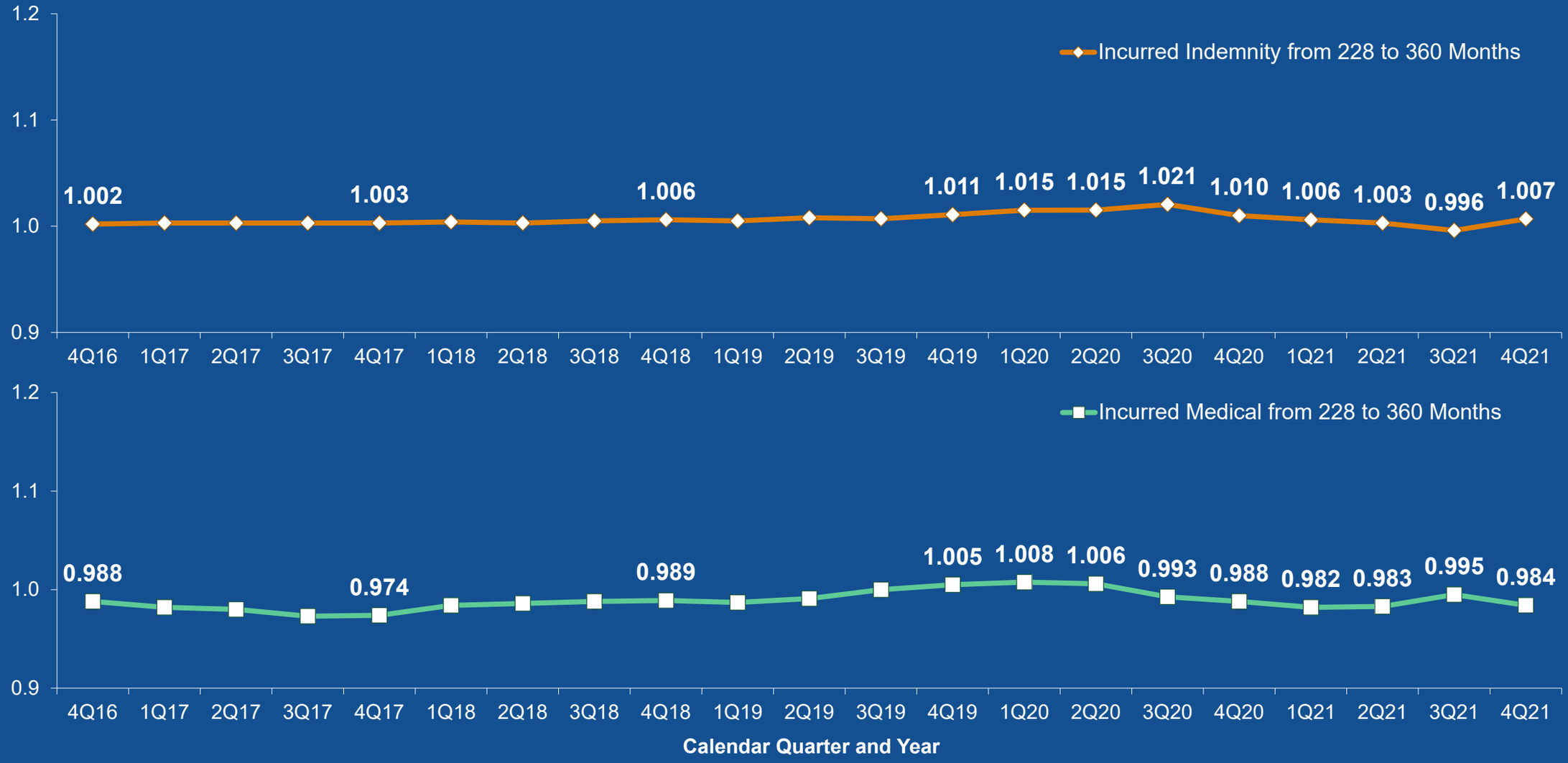
Source: WCIRB Aggregate Financial Data

Cumulative Incurred Development from 228 to 360 Months

As of December 31, 2021



WCIRB California™
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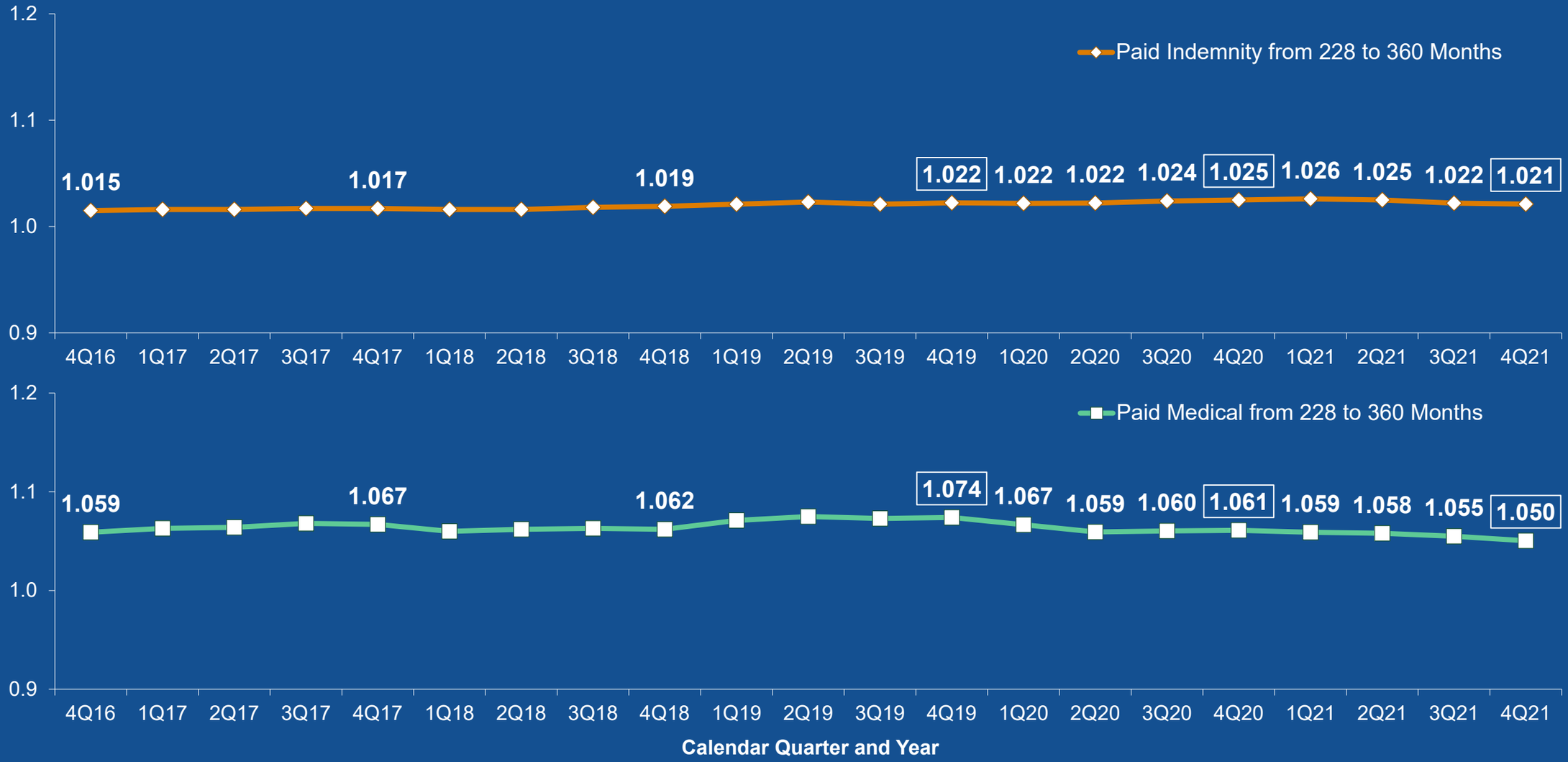
Source: WCIRB Aggregate Financial Data

Cumulative Paid Development from 228 to 360 Months

As of December 31, 2021



WCIRB California™
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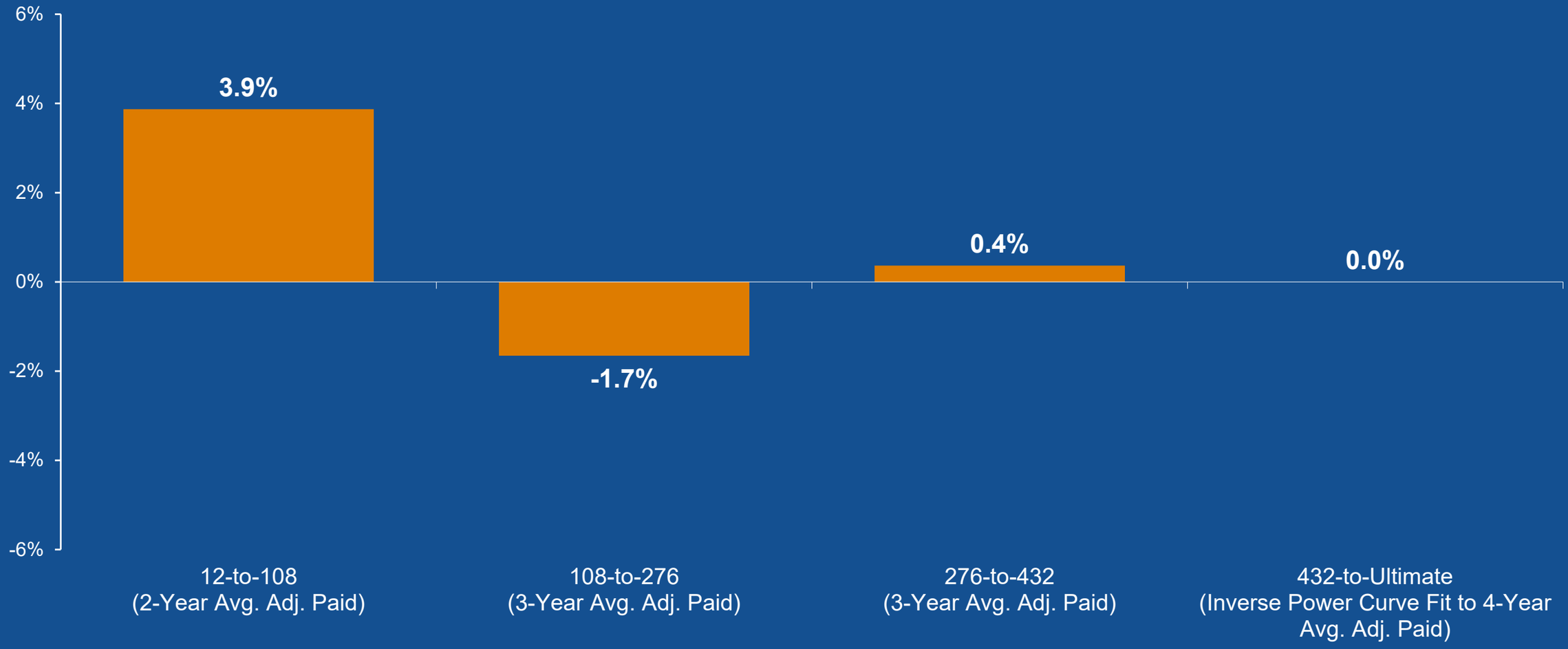
Source: WCIRB Aggregate Financial Data

Change in Projected Medical Development Factor for AY 2020

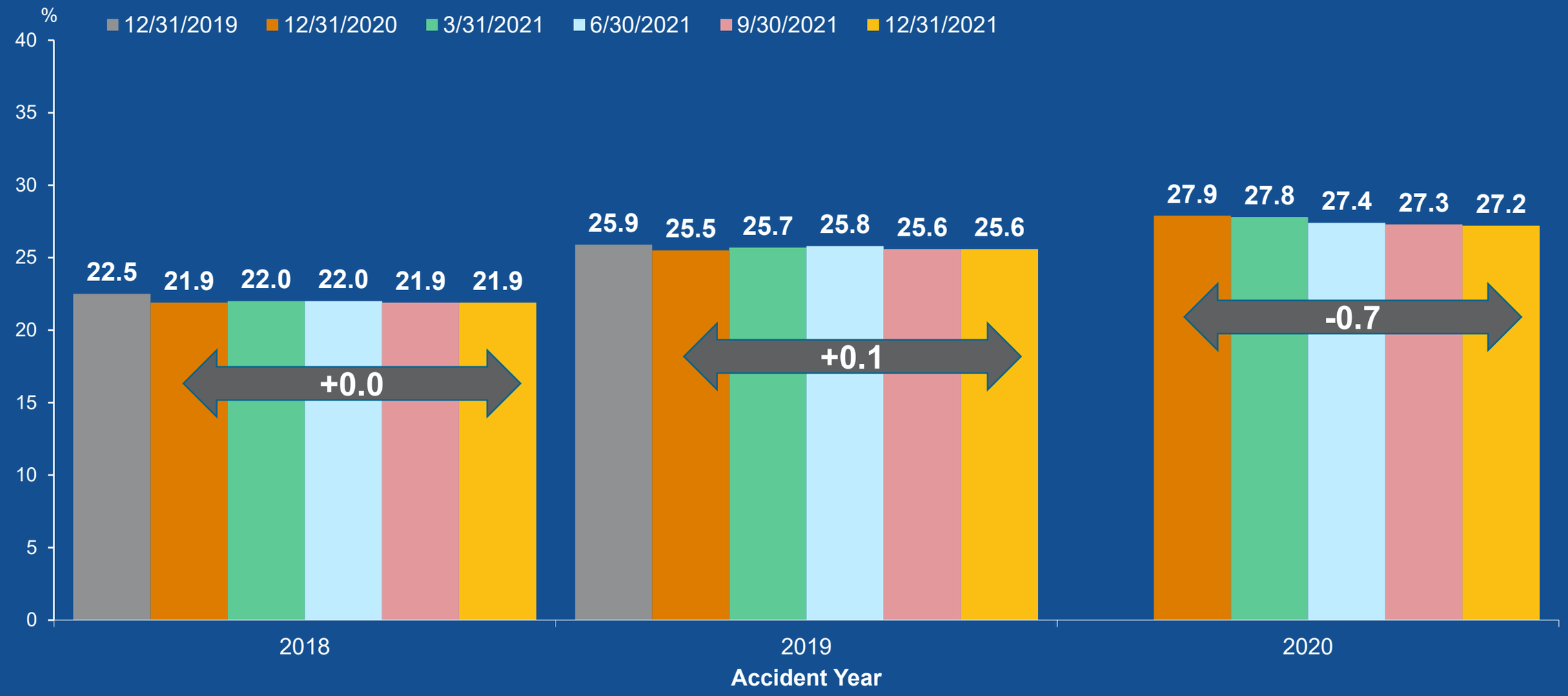
12/31/2020 to 12/31/2021 Experience



Source: WCIRB Aggregate Financial Data

Developed Indemnity Loss Ratios (Exhibit 3.1)

As of December 31, 2021



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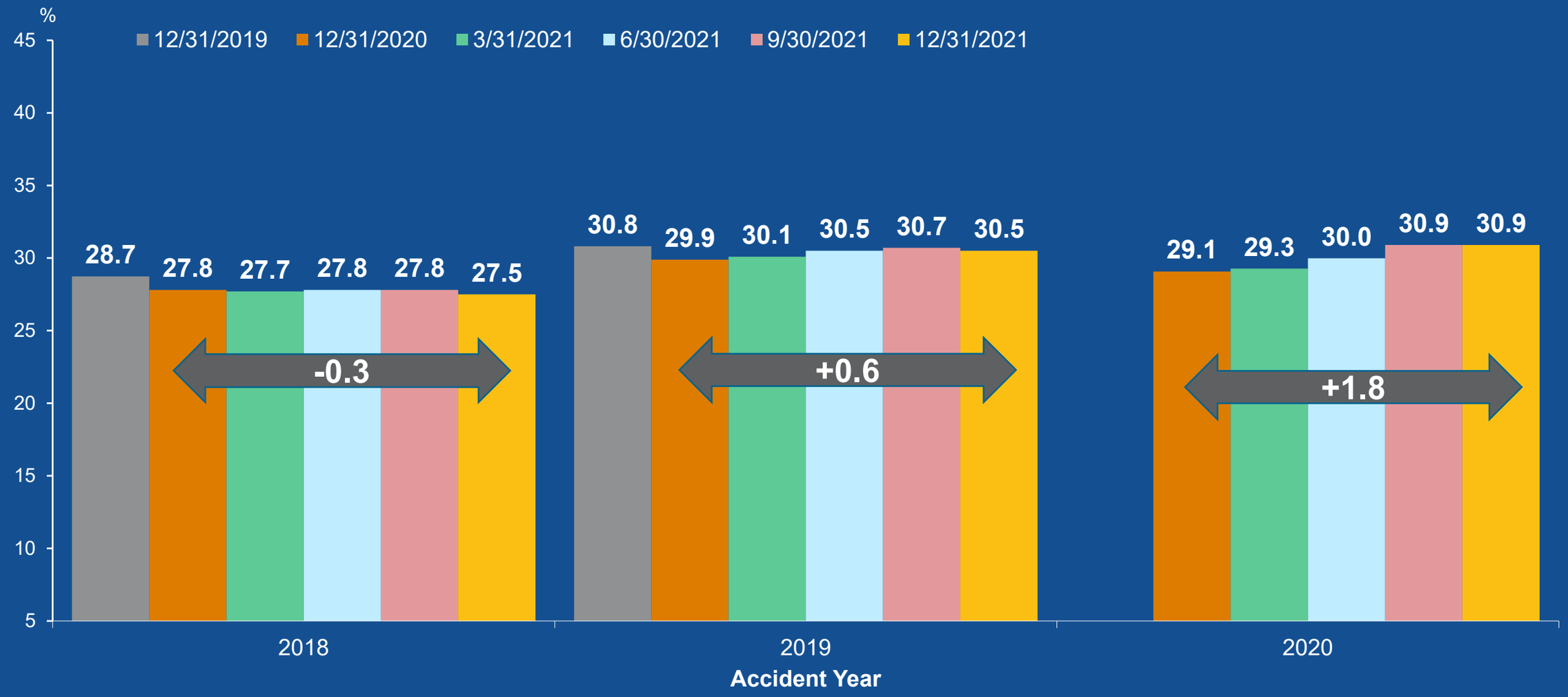
Note: All loss ratios are adjusted to the loss development methodology reflected in the Actuarial Committee Agenda and may not be comparable to the actual loss ratios projected at that time.
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims

Developed Medical Loss Ratios (Exhibit 3.2)

As of December 31, 2021



Note: All loss ratios are adjusted to the loss development methodology reflected in the Actuarial Committee Agenda and may not be comparable to the actual loss ratios projected at that time.
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims

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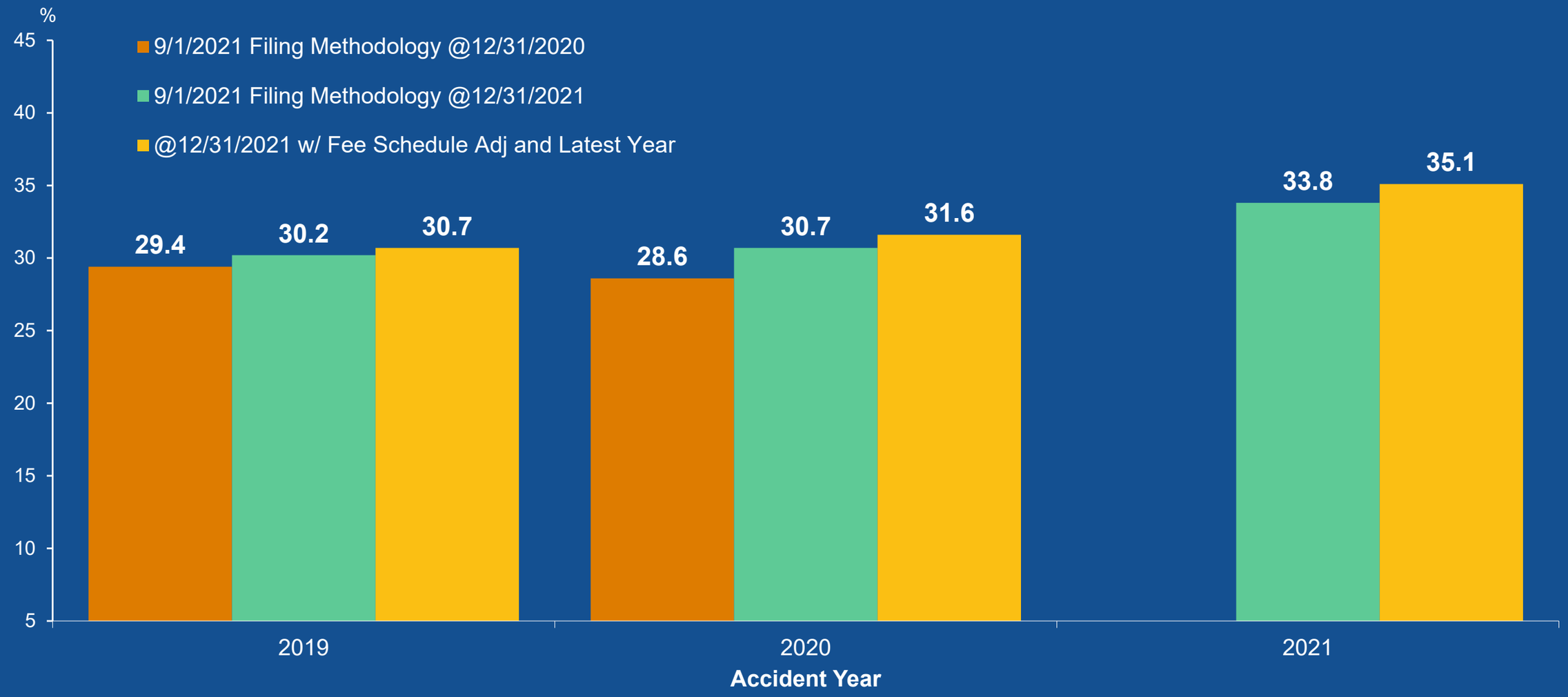
Developed Medical Loss Ratio Comparison

As of December 31, 2021



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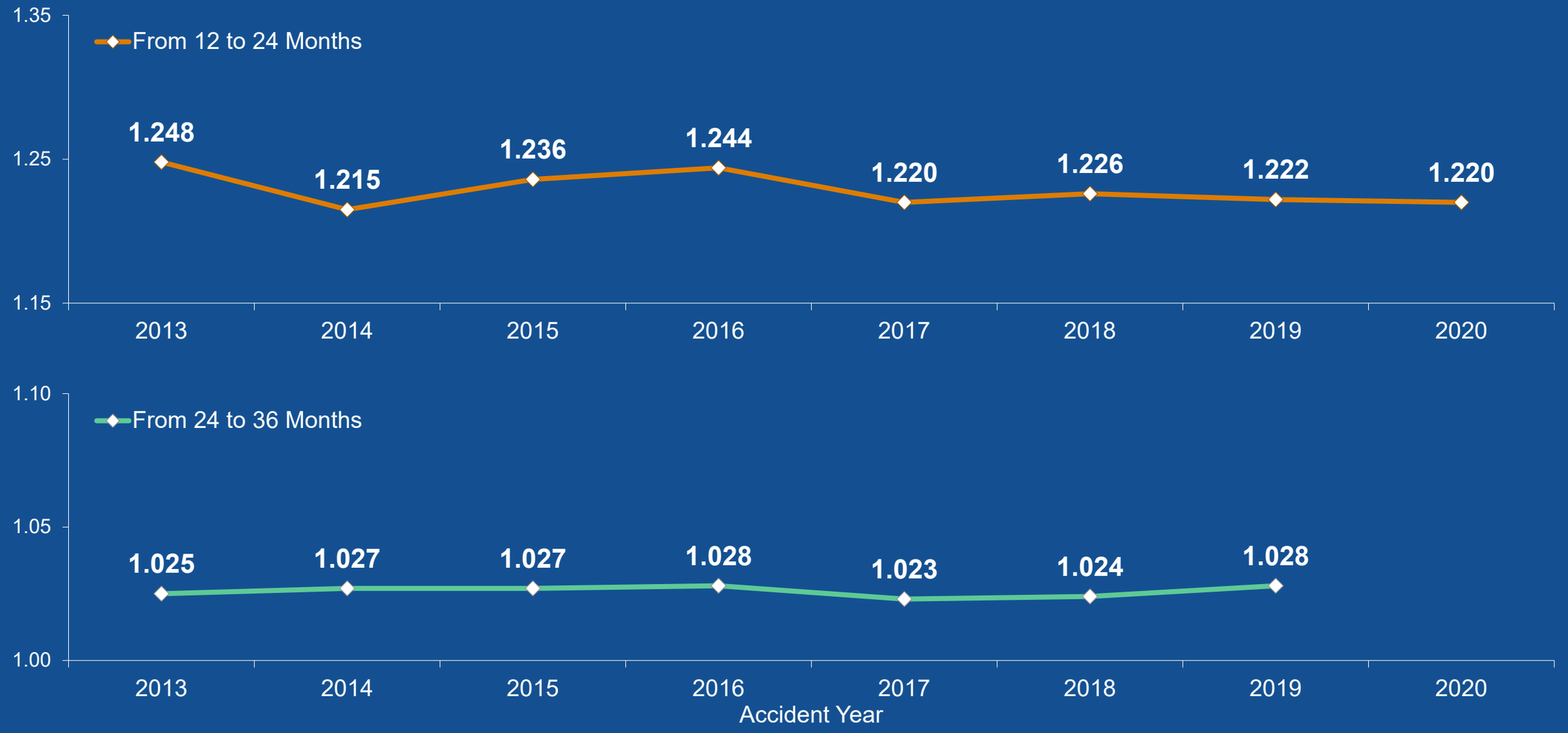
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims

Indemnity Claim Count Development (Exhibit 8.1)

As of December 31, 2021



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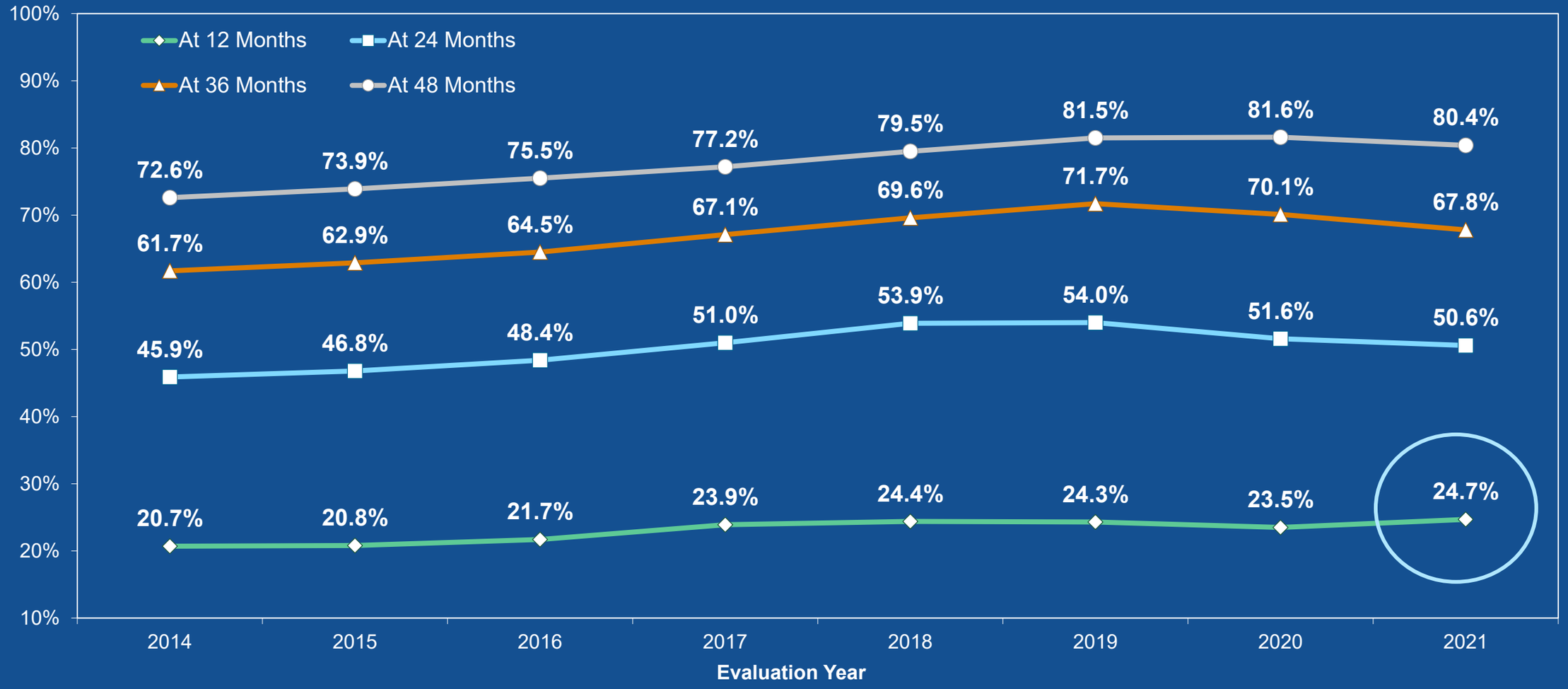
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims

Estimated Ultimate Indemnity Claim Settlement Ratios (Exhibit 9.2)

As of December 31, 2021



WCIRB California™
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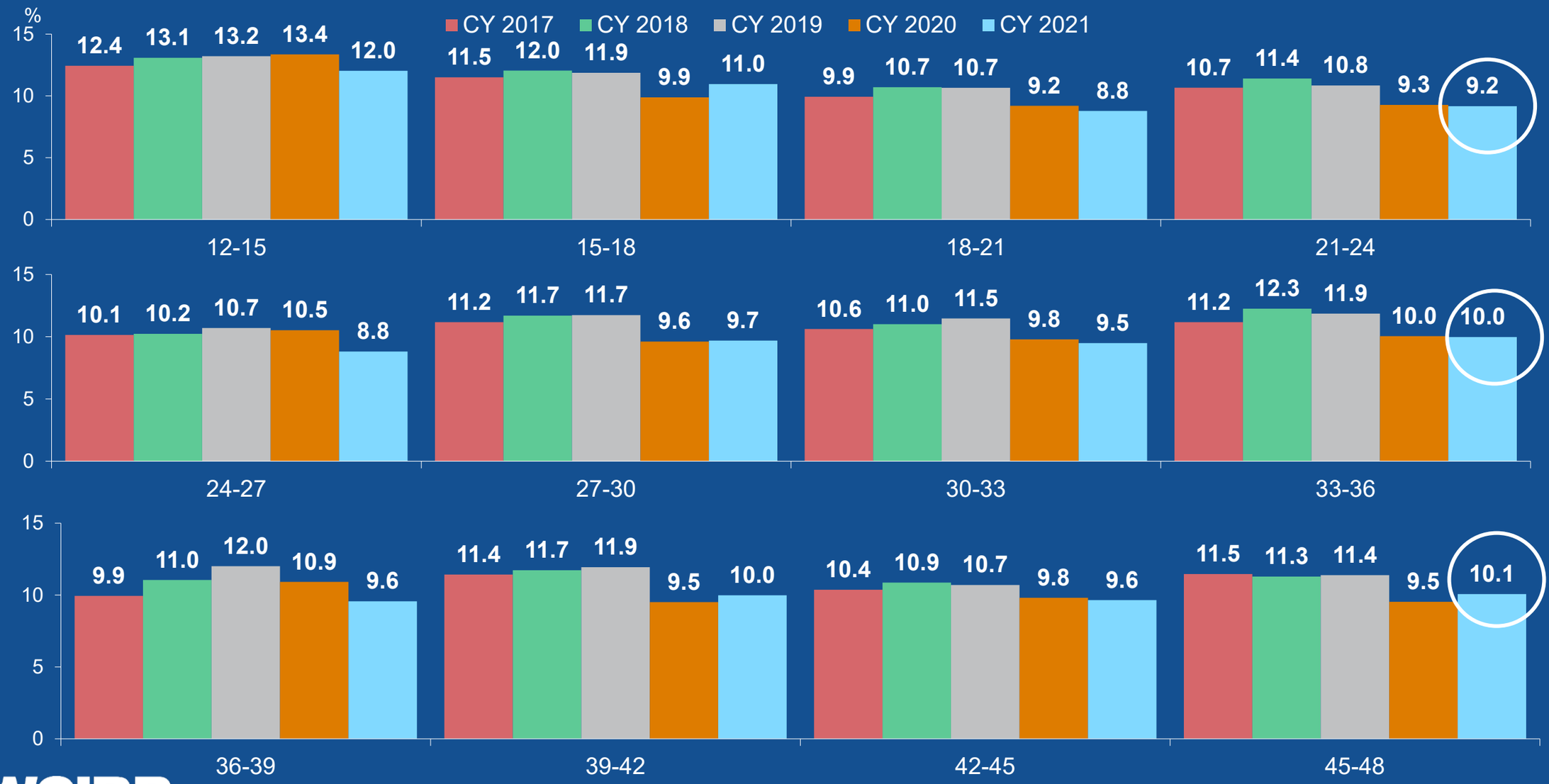
Source: WCIRB Aggregate Financial Data and projections excluding COVID-19 claims

Incremental Closed Indemnity Claims Compared to Estimated Prior Open Claims

As of December 31, 2021



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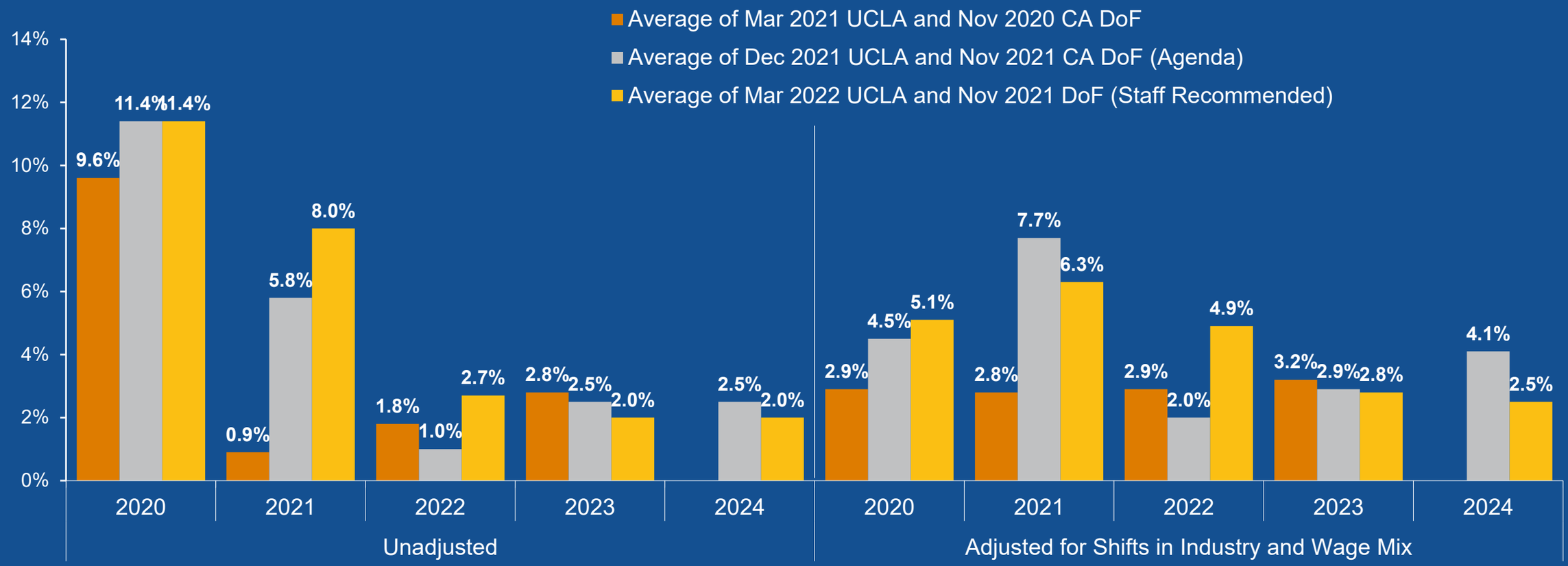
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims

9/1/2022 Loss Development Considerations

- Claim settlement rates continue to shift but are moderating in 2021
- Adjustments to paid medical reviewed at December meetings
  - Pharmaceutical cost changes through 2018
  - 2021 E & M and Med-Legal fee schedule changes
- Two-year average adjusted paid through 108 months used in 9/1/2021 Filing
  - Based on calendar years 2019 and 2020
  - Used to mitigate impact of pandemic in latest CY
  - Latest year (2021) may be more appropriate basis than average of 2021 and 2020 for 9/1/2022 Filing

Average Wage Level Change Forecast (Exhibit 5.1)

As of March 2022



Average Annual Wage Change Projection from 2021:

9/1/2021 Filing: 2.9%

Staff Recommended: 3.7%

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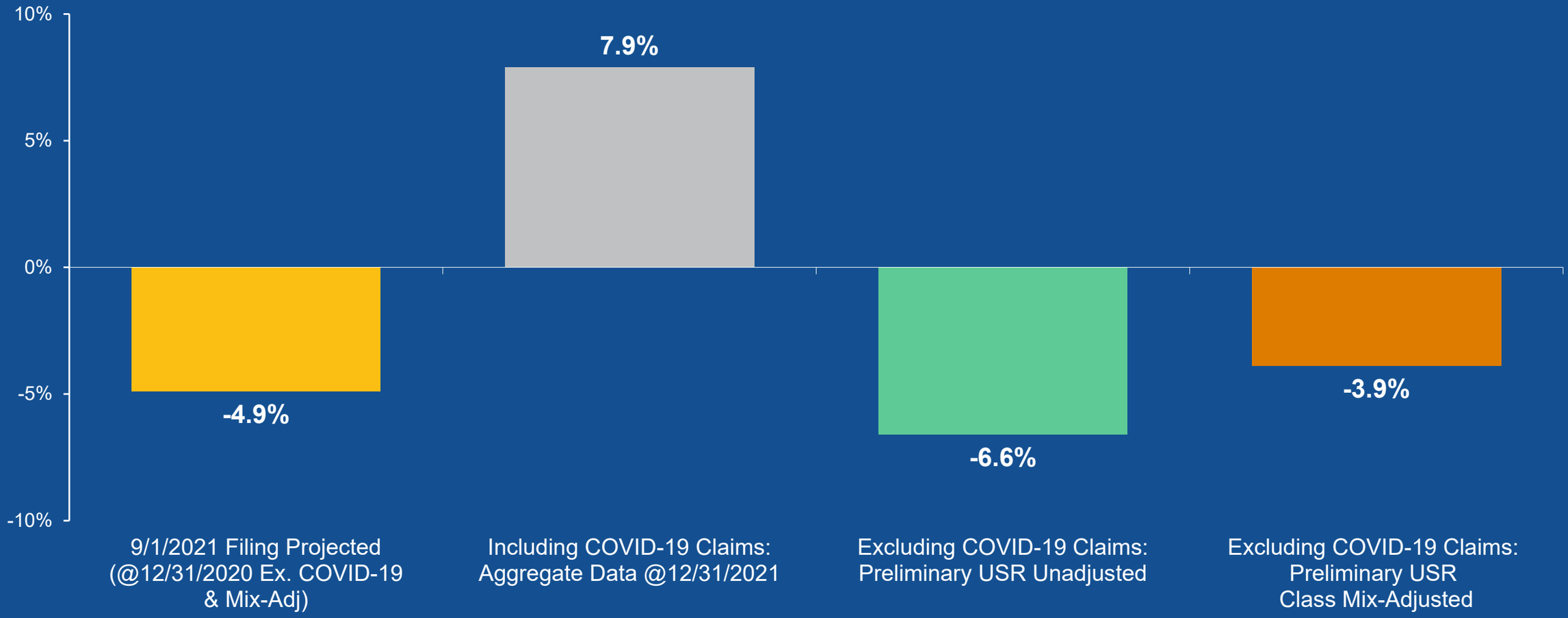
Source: UCLA Anderson School of Business and California Department of Finance forecasts

Estimated Accident Year 2020 Indemnity Claim Frequency Changes (Exhibit 10 Updated)

As of December 31, 2021



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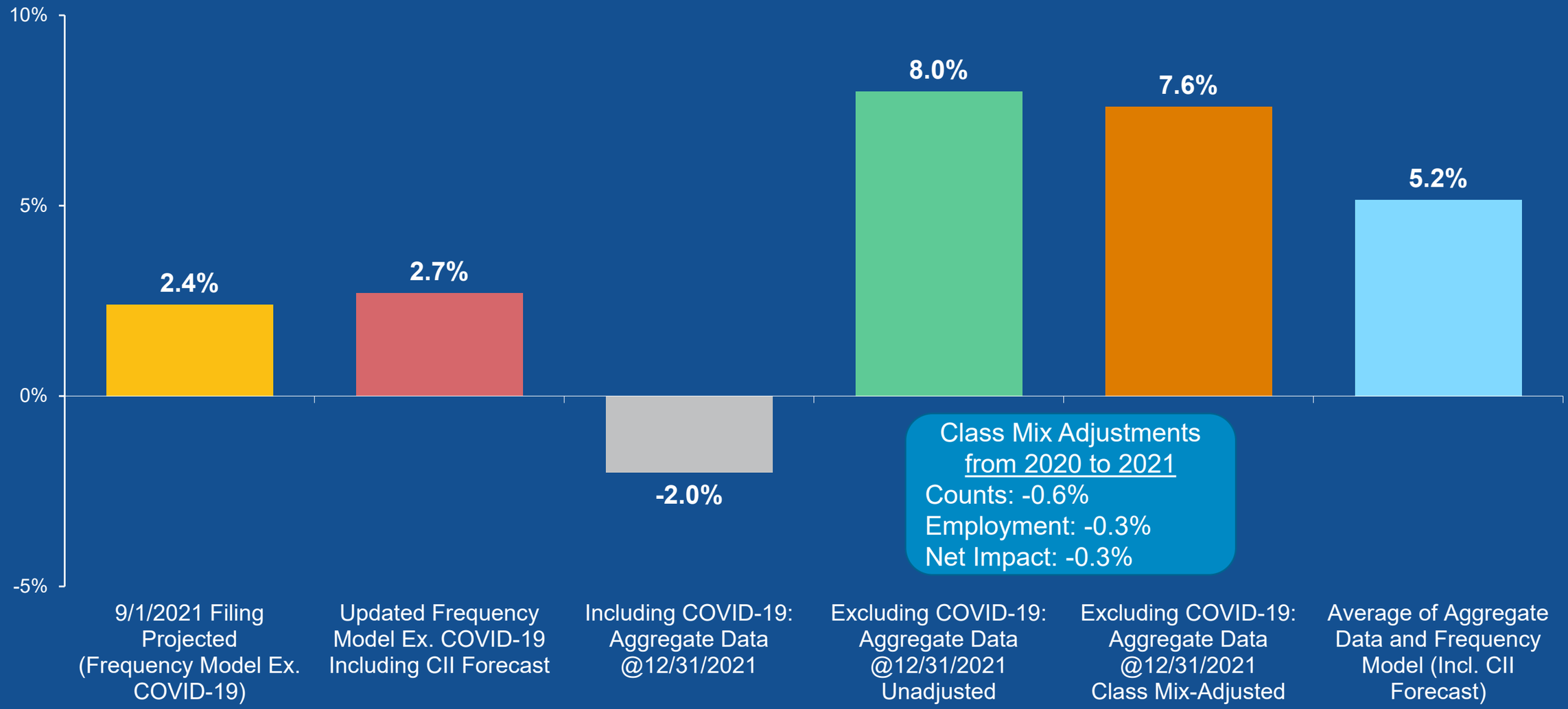
Source: WCIRB Aggregate Financial Data, unit statistical data, and UCLA Anderson forecast

Estimated Accident Year 2021 Indemnity Claim Frequency Changes (Exhibits 6.1 and 10 Updated)

As of December 31, 2021



WCIRB California™
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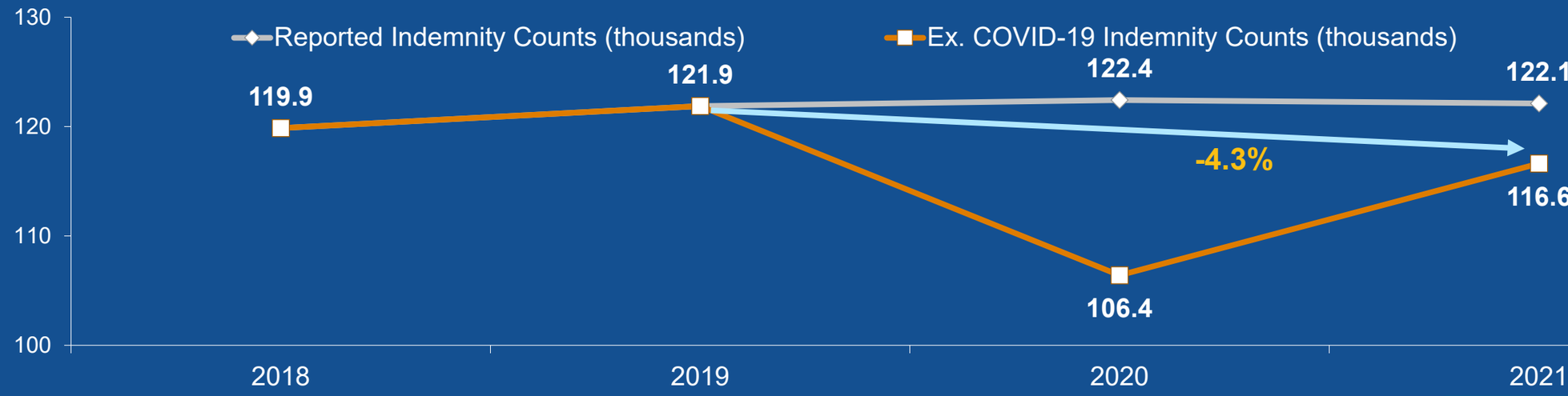
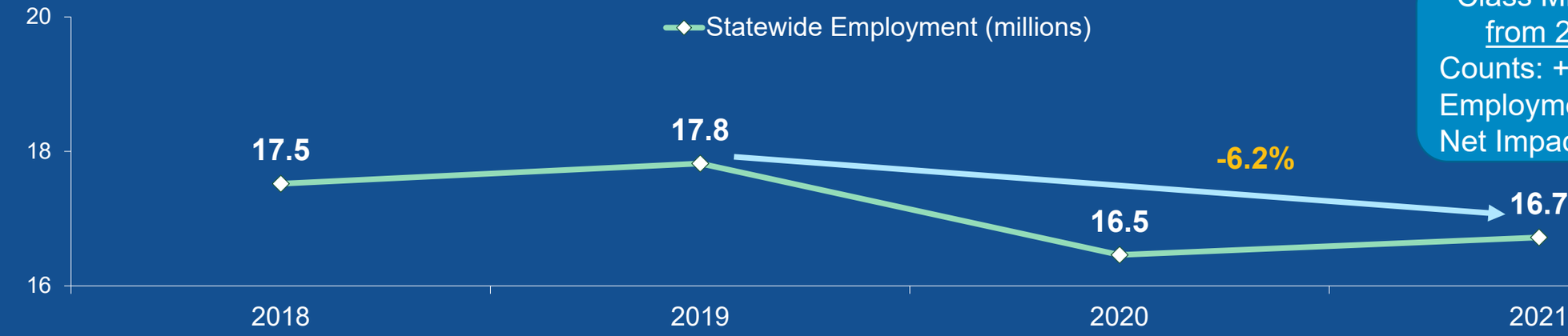
Source: WCIRB Aggregate Financial Data and UCLA Anderson forecast

Changes in 12-Month Indemnity Claim Counts and Employment Levels

As of December 31, 2021





Class Mix Adjustments from 2019 to 2021
Counts: +2.3%
Employment: +1.5%
Net Impact: +0.8%

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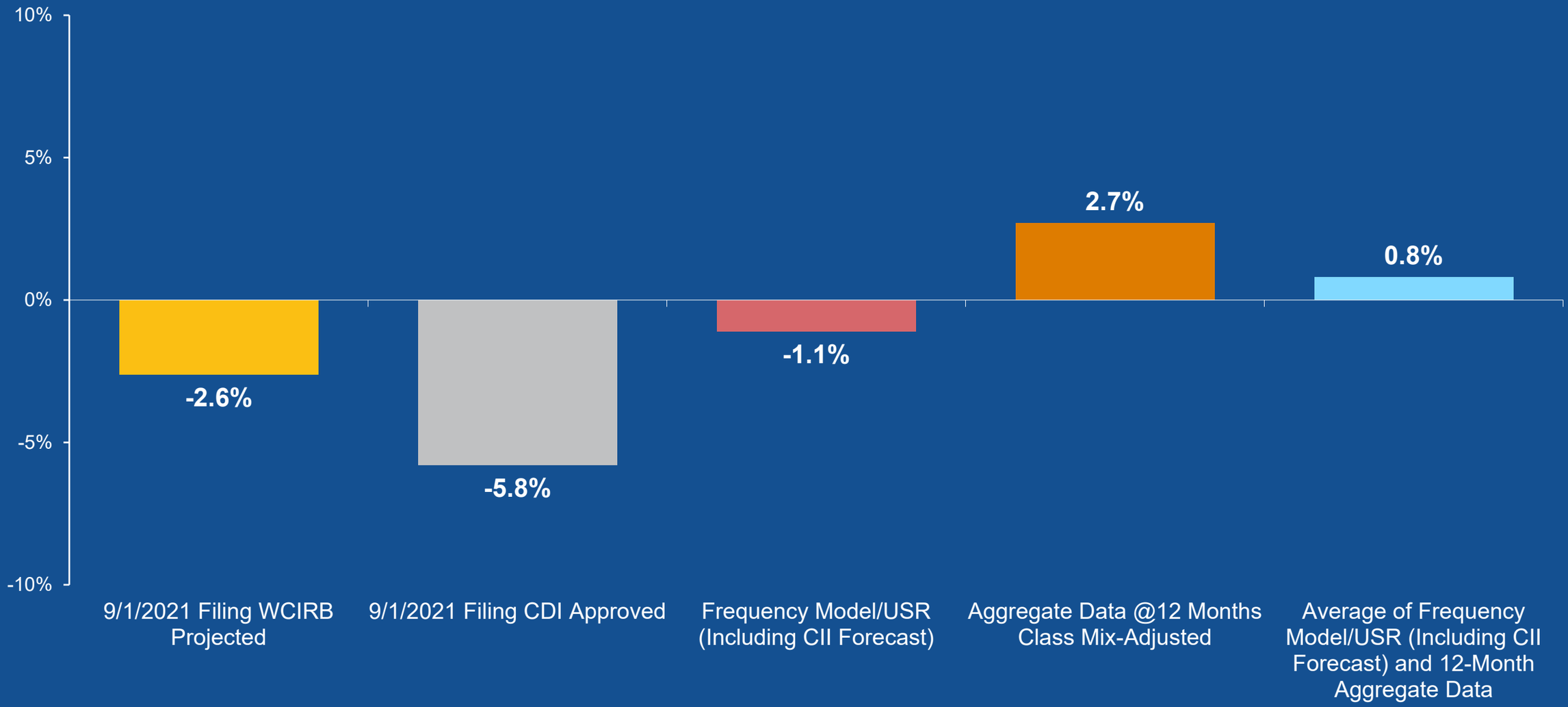
Source: WCIRB Aggregate Financial Data and UCLA Anderson forecast. Employment totals are adjusted to a common insurer mix level.

Estimated 2019 to 2021 Intra-Class Indemnity Claim Frequency Changes Excluding COVID-19 Claims

As of December 31, 2021

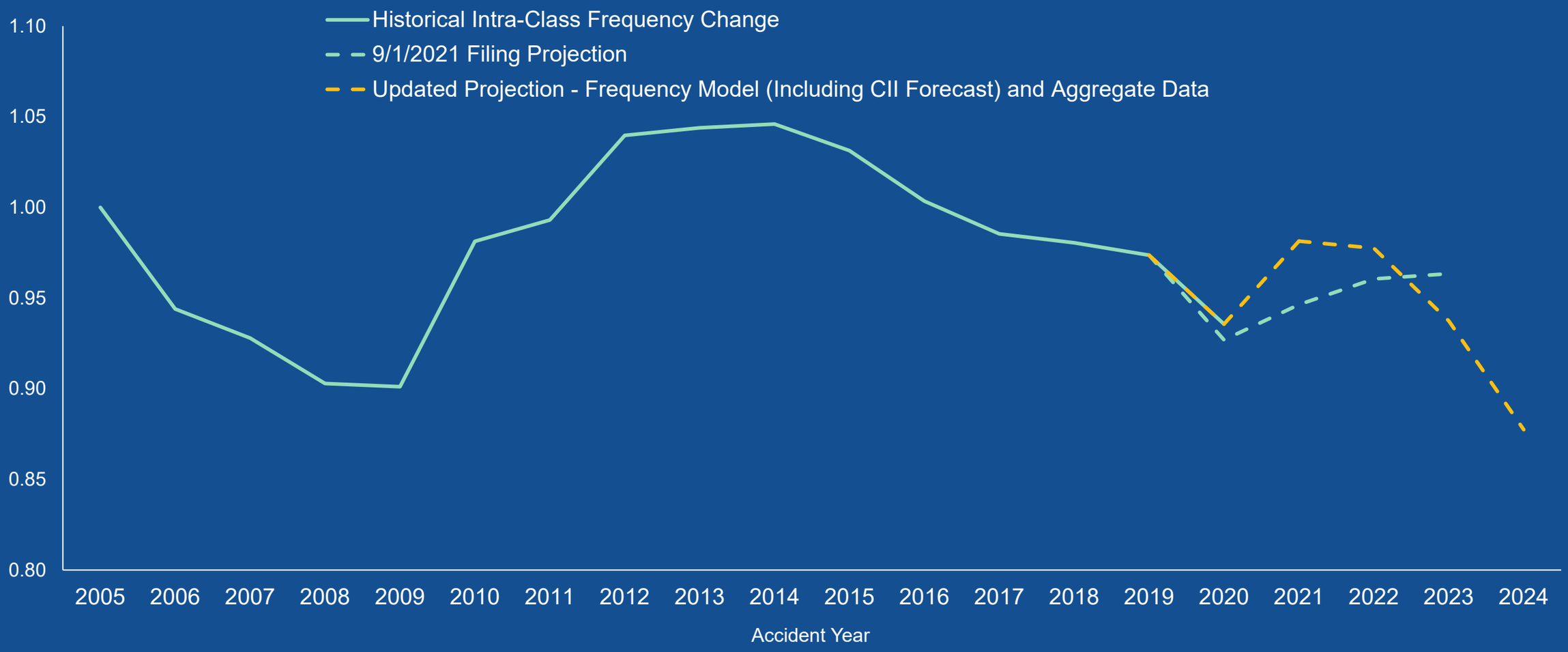


WCIRB California™
Objective. Trusted. Integral.

Source: WCIRB Aggregate Financial Data and UCLA Anderson forecast

Indemnity Claim Frequency Indexed to 2005

As of December 31, 2021

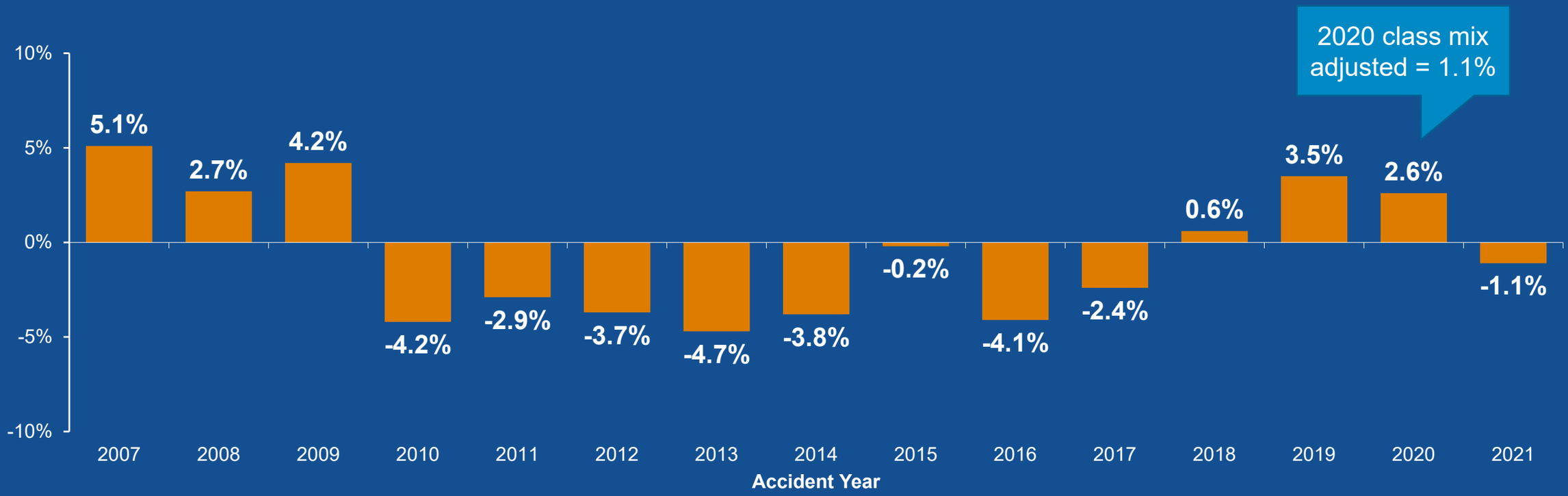


WCIRB California™
Objective. Trusted. Integral.

Source: WCIRB Unit Statistical Data and Indemnity Claim Frequency Model

Projected Changes in On-Level Indemnity Severity (Exhibit 6.2)

As of December 31, 2021



Annual Exponential Trend Based on:

1990 to 2021: 0.9%

2005 to 2021: -1.3%

2017 to 2021: 1.7%

9/1/2021 Filing Selected: 1.0%

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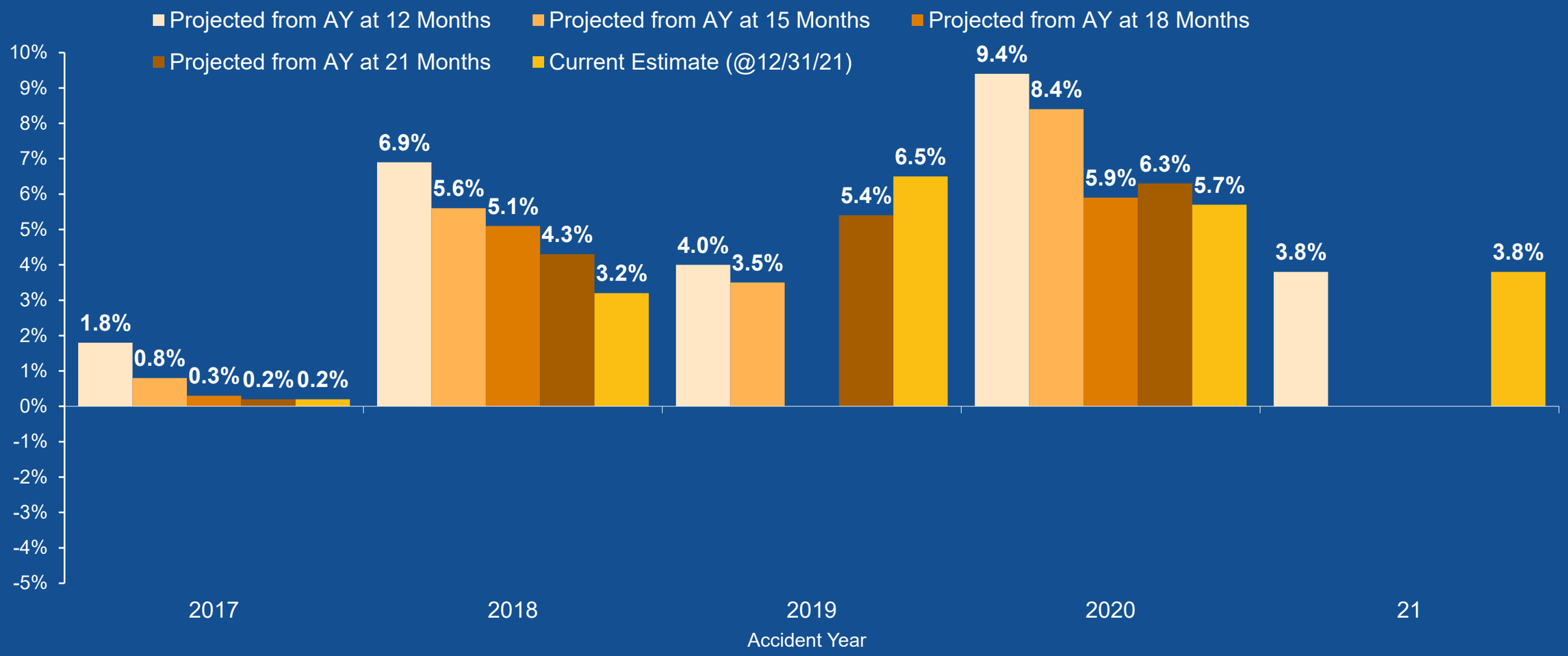
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims and projections

Indemnity Severity Changes Projected from Early Evaluations Compared to Current

As of December 31, 2021



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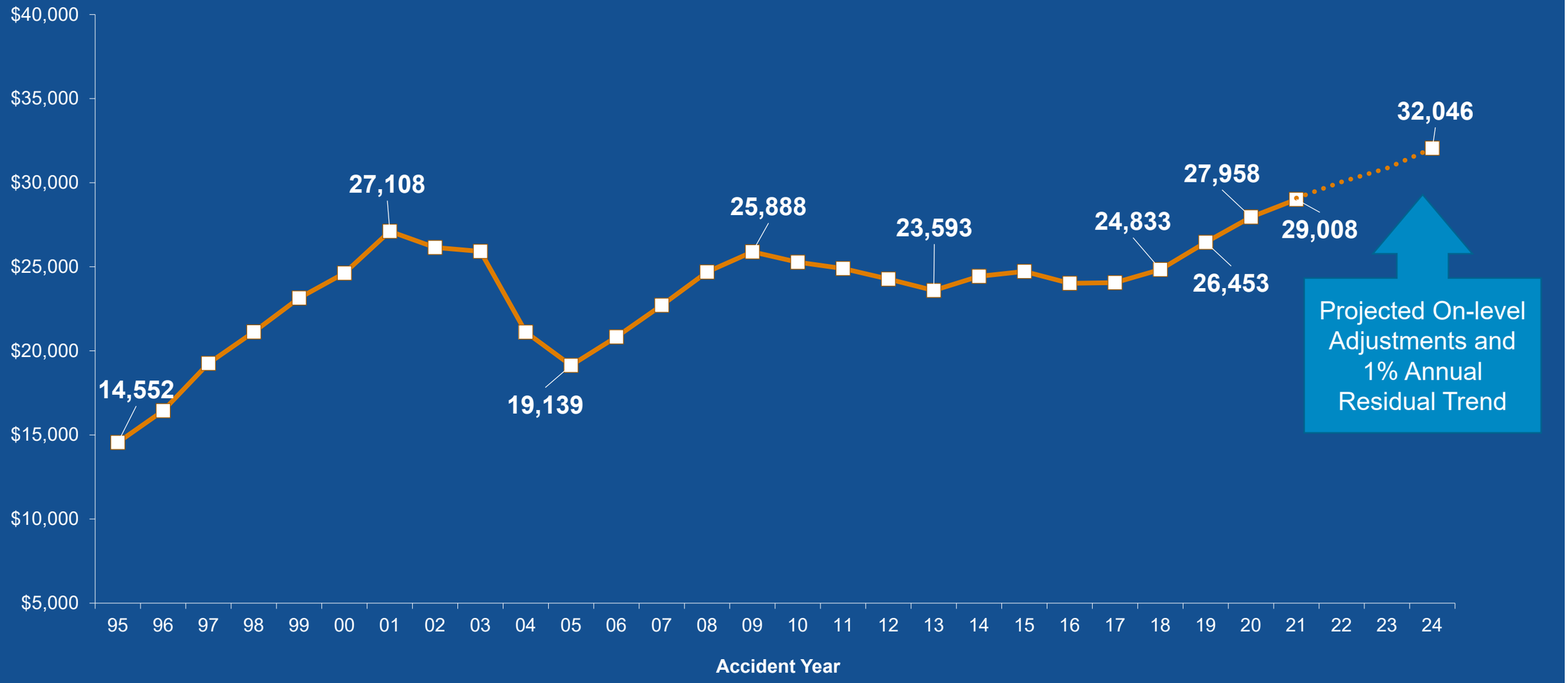
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims

Ultimate Indemnity per Indemnity Claim

As of December 31, 2021



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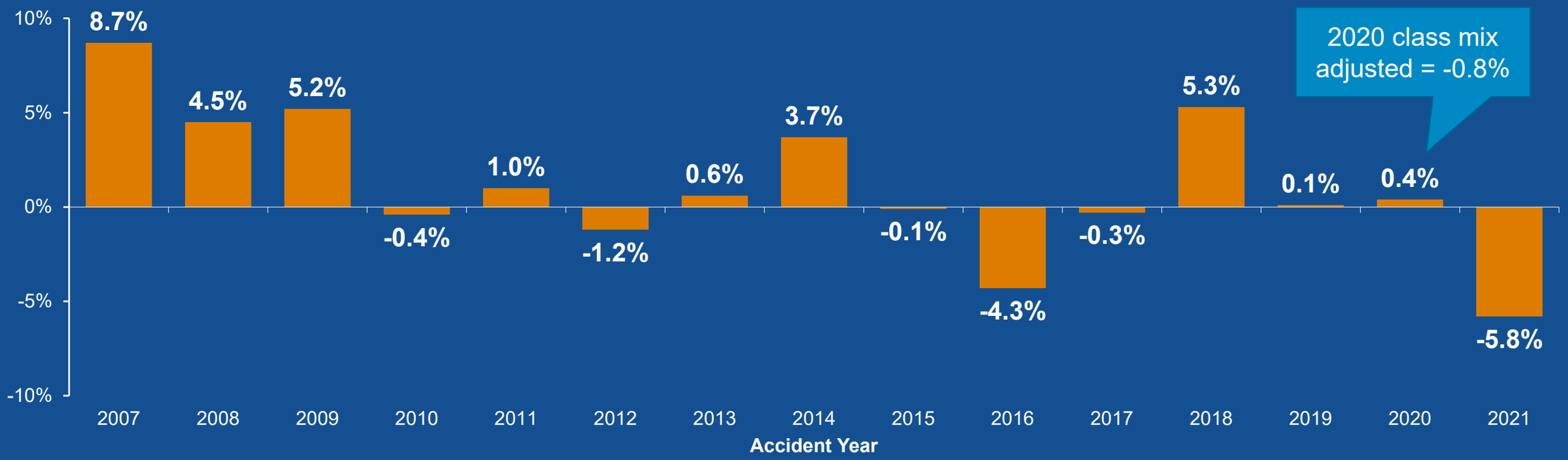
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims and projections

Projected Changes in On-Level Medical Severity (Exhibit 6.4)

As of December 31, 2021



Annual Exponential Trend Based on:

1990 to 2021 (including MCCP): 4.8%

2005 to 2021: 1.1%

2017 to 2021: 0.0%

9/1/2021 Filing Selected: 1.0%

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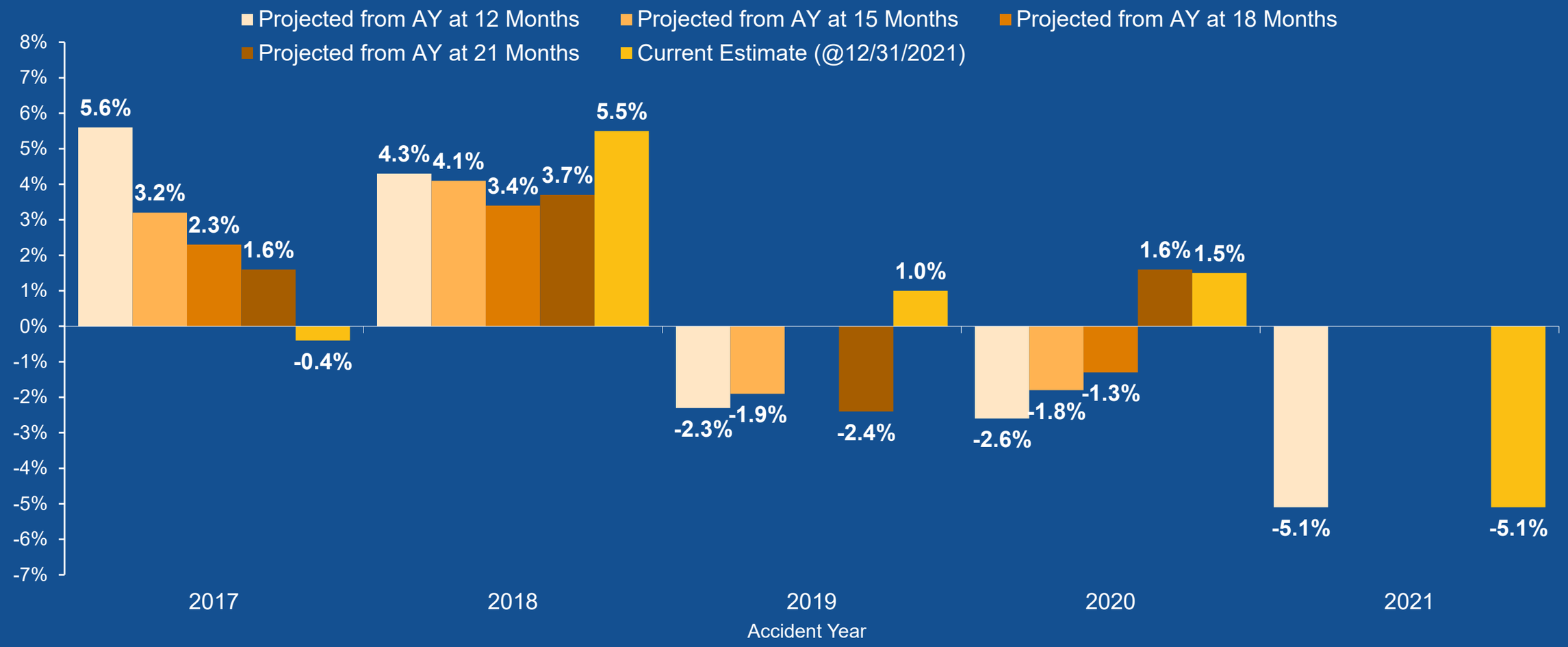
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims and projections. MCCP costs are excluded from accident years 2011 and prior.

Medical Severity Changes Projected from Early Evaluations Compared to Current

As of December 31, 2021



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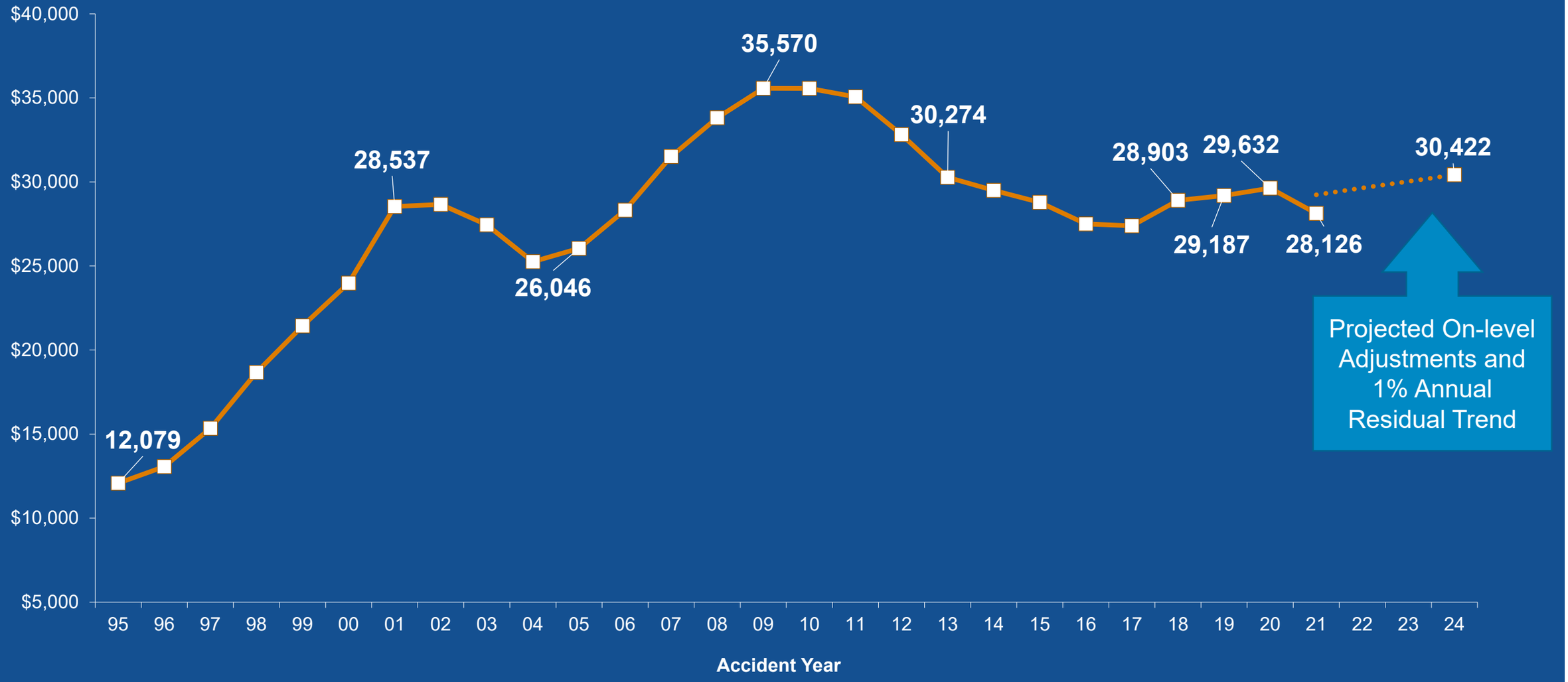
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims

Ultimate Medical per Indemnity Claim

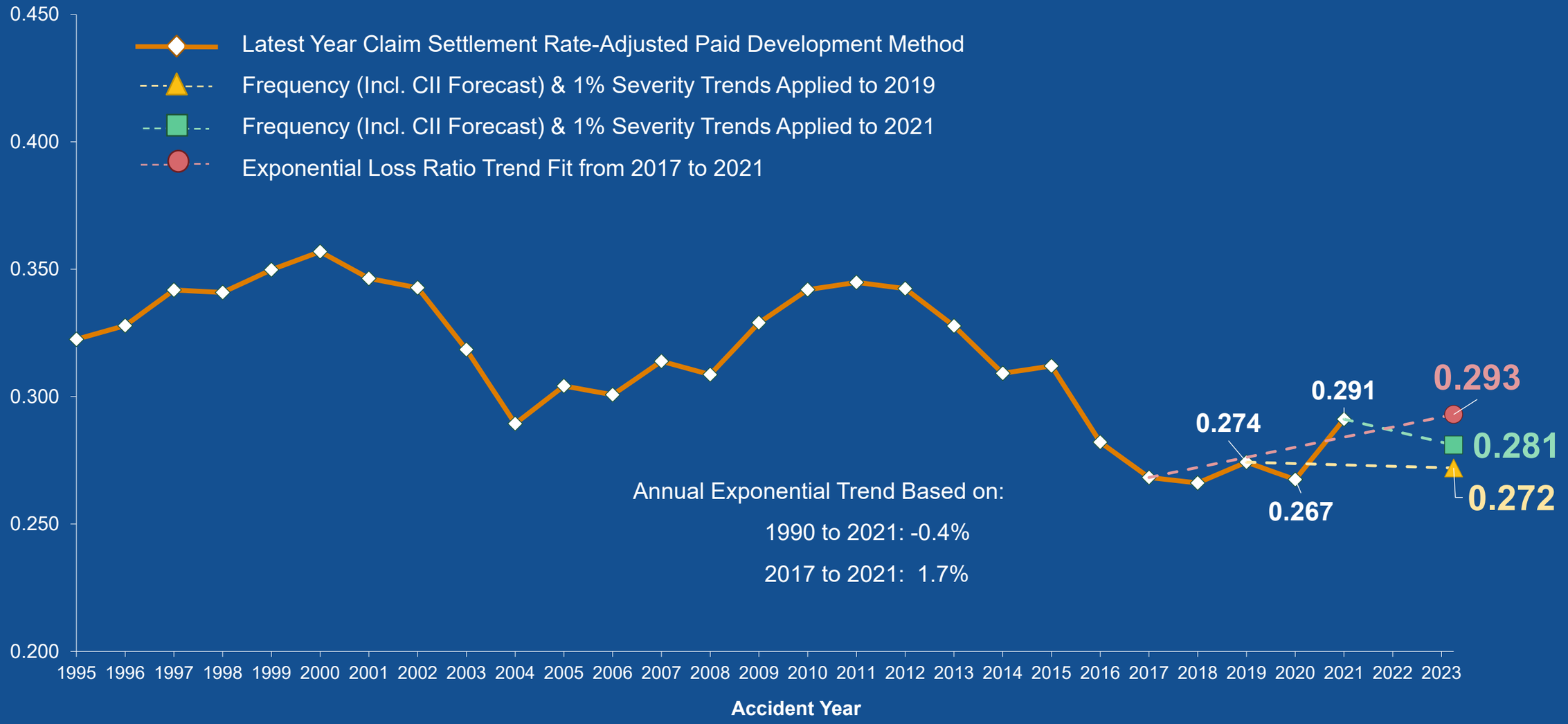
As of December 31, 2021



Source: WCIRB Aggregate Financial Data excluding COVID-19 claims and projections.

Preliminary On-Level Indemnity Loss Ratios with Staff Recommended On-level Adjustments

As of December 31, 2021



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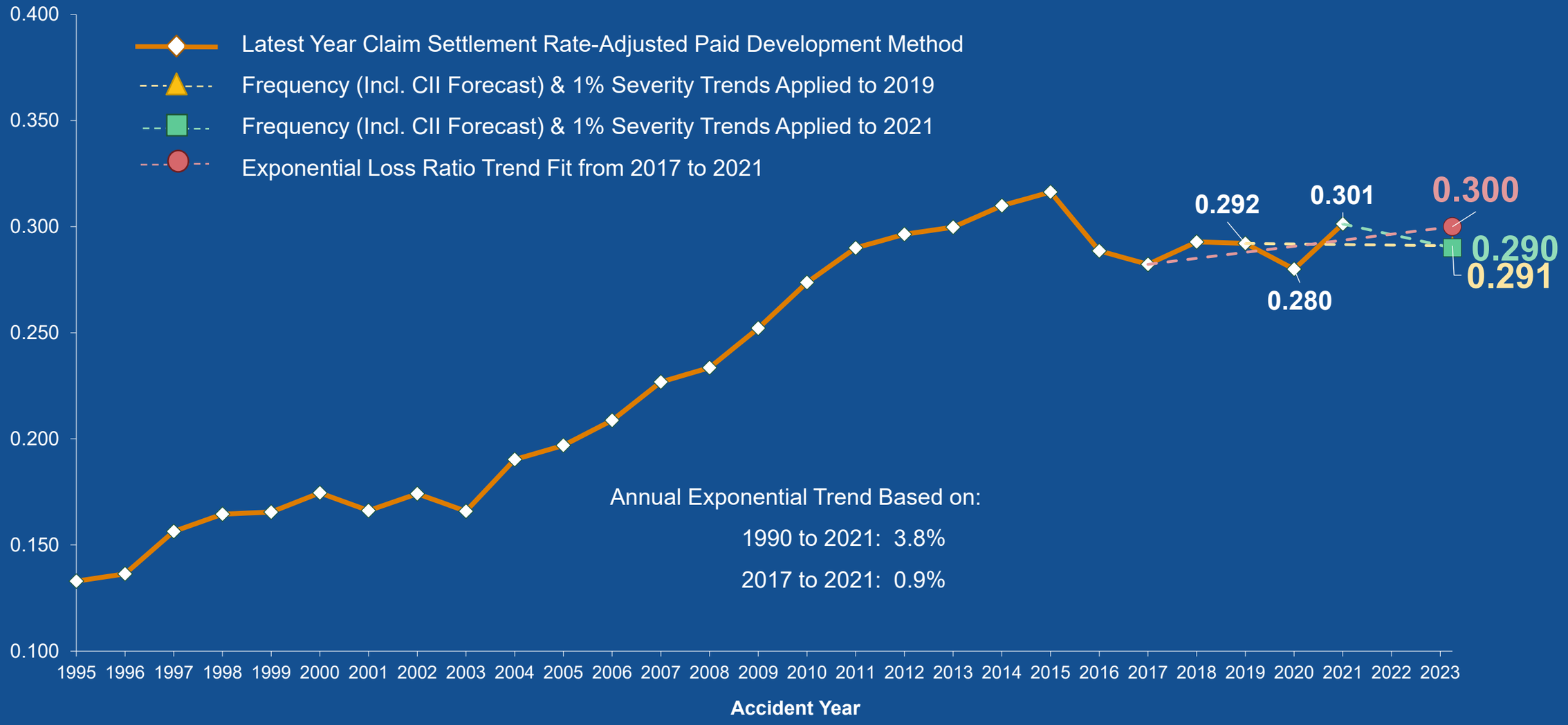
Source: WCIRB Aggregate Financial Data excluding COVID-19 claims and projections

Preliminary On-Level Medical Loss Ratios with Staff Recommended On-level Adjustments

As of December 31, 2021



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Source: WCIRB Aggregate Financial Data excluding COVID-19 claims and projections

9/1/2022 Trending Considerations

- On-level adjustments
  - TD cap for AY 2023
  - E & M and Med-Legal fee schedule changes
  - Economic shifts impacting average wage
  - Premium audits impacting CY 2020 and 2021
- Trending
  - Frequency – 12-month estimate for 2021 and appropriate model forecasts
  - Severity – longer vs. shorter term estimates
  - Combined on-level loss – modest growth since 2017
  - Appropriate years to use in trending methodology

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