

Actuarial Committee

Meeting Agenda

Date	Time	Location	Staff Contact
December 8, 2022	9:00 AM	Webinar Teleconference	David M. Bellusci

1901 Harrison Street, 17th Floor • Oakland, CA 94612 • 415.777.0777 • Fax 415.778.7007 • www.wcirb.com • wcirb@wcirb.com

Released: December 1, 2022

To Members of the Actuarial Committee, WCIRB Members and All Interested Parties:

This meeting is Open to the Public.

Please use this <u>link</u> to register for the meeting webinar. After registering, you will receive a confirmation email containing information about the meeting.

I. Approval of Minutes

None

II. Working Group Meeting Summaries

Actuarial Research Working Group Meeting held November 10, 2022

III. New Business

- A. AC22-12-05: Review of Paid and Incurred Loss Development Methods
- B. AC22-12-06: Retrospective Rating Plan Updates
- C. AC22-12-07: Updates to the Medical Characteristics of COVID-19 Claims and Long COVID Study
- D. AC22-12-08: Telehealth Study
- IV. Matters Arising at Time of Meeting
- V. Next Meeting Date: TBD
- VI. Adjournment

Antitrust Notice

As members of the Workers' Compensation Insurance Rating Bureau of California (WCIRB), you are bound, when involved in meetings, presentations or other activities of the WCIRB, to limit your actions (as well as discussions and virtual chats, other than social ones) to matters relating to the business of the WCIRB. Matters that do not relate directly to WCIRB business should be avoided. Members should particularly avoid discussions, chats or conduct that could be construed as intended to affect competition (or access to markets). Thus, as members, you should not discuss or pursue the business interests of individual insurers or others, including, in particular, the plans of individual members involving, or the possibility or desirability of (a) raising, lowering, or stabilizing prices (premiums or commissions); (b) doing business or refusing to do business with particular, or classes of, insurers, reinsurers, agents, brokers, or in sureds, or in particular locales; or (c) potential actions that would affect the availability of products or service either generally or in specific markets or locales.

Notice

The information in this Agenda was developed by the Workers' Compensation Insurance Rating Bureau of California (WCIRB) for the purpose of assisting the WCIRB Actuarial Committee. The WCIRB cannot make any guarantees if this information is used for any other purpose and the WCIRB shall not be liable for any damages, of any kind, whether direct, indirect, incidental, punitive or consequential, arising from the use of or reliance upon this information for any other purpose.

© 2022 Workers' Compensation Insurance Rating Bureau of California. All rights reserved.

No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including, without limitation, photocopying and recording, or by any information storage or retrieval system without the prior written permission of the Workers' Compensation Insurance Rating Bureau of California (WCIRB), unless such copying is expressly permitted in this copyright notice or by federal copyright law. No copyright is claimed in the text of statutes and regulations quoted within this work.

Each WCIRB member company, including any registered third party entities, (Company) is authorized to reproduce any part of this work solely for the following purposes in connection with the transaction of workers' compensation insurance: (1) as necessary in connection with Company's required filings with the California Department of Insurance; (2) to incorporate portions of this work, as necessary, into Company manuals distributed at no charge only to Company employees; and (3) to the extent reasonably necessary for the training of Company personnel. Each Company and all agents and brokers licensed to transact workers' compensation insurance in the state of California are authorized to physically reproduce any part of this work for issuance to a prospective or current policyholder upon request at no charge solely for the purpose of transacting workers' compensation insurance and for no other purpose. This reproduction right does not include the right to make any part of this work available on any website or any form of social media.

Workers' Compensation Insurance Rating Bureau of California, WCIRB, WCIRB California, WCIRB Connect, WCIRB Inquiry, WCIRB CompEssentials, X-Mod Direct, eSCAD, Comprehensive Risk Summary, X-Mods and More, Annual Business Comparative and the WCIRB California logo (WCIRB Marks) are registered trademarks or service marks of the WCIRB. WCIRB Marks may not be displayed or used in any manner without the WCIRB's prior written permission. Any permitted copying of this work must maintain any and all trademarks and/or service marks on all copies.

To seek permission to use any of the WCIRB Marks or any copyrighted material, please contact the WCIRB at customerservice@wcirb.com.



Actuarial Research Working Group

Meeting Summary

To: Participants of the Actuarial Research Working Group Date: November 28, 2022

RE: Summary of November 11, 2022 Meeting

Discussion Topics

At the meeting, the following topics were discussed.

A. Restrospective Rating Plan Update

The Working Group was informed of the update schedule for the study with the first phase on incurred loss development concluding this year. The Working Group was reminded that, at the August 1, 2022 meeting, it was agreed that this phase of the study would focus on investigating alternate calendar year sampling in derivation of simulation tables as opposed to an all-year straight average and reweighting the simulation database to account for changes in classification mix.

Staff presented three measures of identifying whether the inclusion of a particular year's data would likely result in a more or less severe size-of-loss distribution. The three measures are the share of open claims not developing, the ratio of open claims developing upward to downward and the incremental claim closing rate. In recent years, all of these measures would indicate lower overall development potential, but did not show any aberrations as changes appear to be long term in nature. One member asked how reopened claims were handled in claim development. Staff noted that reopening claims did not directly impact these comparisons, which are based on open claims. Staff clarified that reopening claims are handled in the simulation from the body of closed claims at fifth report level, some of which are selected to reopen at a later maturity based on past patterns.

Staff performed sensitivity testing by excluding each year from both the loss development and closing rate tables when compiling simulation tables. The impact of excluding any year was modest and the impact was greater at larger loss limits.

Staff investigated different methods to alter the weight a particular year should be given when compiling the simulation tables. These methods were not tested further because they either made little difference or implicitly assumed a weighting pattern that was unintuitive and hinged on the assumption of the appropriateness of a specific measure of "normal" development. Staff also tested approaches that would explicitly give more weight to more recent years which result in much lower LERs than the current straight average approach. Staff noted more heavily weighting recent years could lead to much higher LERs during a different claims environment. These findings, coupled with the fact that the simulation models the life of a claim for up to one hundred years of development led staff to suggest to continue use of an all-year straight average method for compiling simulation tables.

Date: November 28, 2022

Staff observed that the classification mix can differ substantially between the simulation database and the effective policy period. Staff developed a simple method to reweight the simulation database using the classification mix from the classification relativities for the same policy period. This method compares the mix of exposure underlying the simulation database to the most recent two policy years from the classification relativities. One member asked about the relationship of excess ratios for classes in the same Retro Hazard Group (RHG) after the reweighting and staff confirmed that there is still a clear demarcation among RHGs after reweighting. Several members had questions about the sharp increase in the percentage change of RHG 5 at the highest limit. Staff noted that the increase was due to a relative increase within this RHG of a few construction classifications.

Working Group members expressed support for staff's recommendations of using all-year straight average incurred development methodologies and for reweighting simulation database using the classification mix from the classification relativities for the same policy period. Some members expressed concerns about the potential distortion in the payroll mix for policy years 2020 and 2021 due to the pandemic.

The Working Group was advised that staff will present an update to the Actuarial Committee to solicit additional feedback.

B. Classification Ratemaking-Small Classifications

The Working Group was reminded that, as part of a multi-year comprehensive review of the classification ratemaking process, the WCIRB is exploring the performance of the current projection methodology for classification relativities for smaller classifications compared to larger classifications. Smaller classifications are defined as those not meeting the current standard of full credibility for classification ratemaking. The Working Group was reminded that at the August 1, 2022 meeting, it was agreed that this study would primarily focus on the performance of the current complement of credibility.

Staff reviewed the impact of limiting individual losses at the \$500,000 threshold on the accuracy of the computed classification relativities for both fully credible classes and smaller classifications and the impact of the current complement of credibility for smaller classifications. Staff assessed accuracy by reviewing the mean squared error (MSE) of the classification relativities for that policy year and the actual loss to payroll ratio relativity based on unit statistical data at first report for policy years 2012 through 2019. For fully credible classes, the MSEs were found to be lower when losses are capped. The difference between the MSEs calculated on a limited and an unlimited basis decreases as the number of years of experience needed for classifications to meet the standard for full crediblility increases. For partially credible classifications, a similar pattern was found with a smaller difference in the MSEs calculated on a limited and unlimited bases as credibility decreases. In addition, staff noticed MSEs calculated on a limited basis but unadjusted for credibility outperform the MSE calculated using the current methodology for classifications with credibility greater than approximately 84%.

Staff explored the accuracy of the current credibility complement for partially credible classifications on a limited basis to remove the impact of the current loss limitation methodology. The current credibility complement is the ratio of losses to payroll in the prior year for the classification adjusted for the average change in the loss to payroll ratio for the NAICS industry to which the classification is assigned. To assess the accuracy of the current complement of

Meeting Summary

Date: November 28, 2022

credibility relative to the credibility weighted relativities, staff calculated two alternative classification relativities: the unadjusted class experience and the current complement of credibility. The current methodology outperformed the unadjusted experience for classifications with credibility less than 85%. For the graph with partially credible classifications on a limited basis, a member asked why unadjusted experience outperforms the current methodology for classifications with higher credibility. In response, staff noted that the observed result may indicate that the current standard for full credibility is too low.

Indicated changes in the relative loss to payroll ratio for a classification are capped at a change of +/-25%. Staff compared the performance of the current methodology for classifications for which the cap never applied to those for which the cap applied at any point during the study period. For classifications not affected by the capping, the unadjusted experience slightly outperformed the current methodology, while the current methodology clearly outperformed the unadjusted experience for classifications affected by the capping.

Staff explored the overall performance of the current methodology for industries with several partially credible classifications. The current methodology narrowly outperformed the unadjusted experience for classifications in Construction and for Manufacturing. The current methodology clearly outperformed the unadjusted experience for classifications in all other industries.

Staff recommended exploring methods to improve the performance of the loss limitation methodology by applying lower loss limitations for smaller classifications and then to study ways to optimize the credibility thresholds based on any updates to the loss limitation methodology. A Working Group member suggested considering loss limits based on a percentile of the loss distribution for the classification rather than applying limits based on the total losses for the classification. A Working Group member also raised general concerns about the reliability of experience for the smallest classifications.

The Working Group was advised that staff will present an update to the Actuarial Committee to solicit additional feedback regarding the experience of small classifications for classification ratemaking and plans to study alternative approaches of applying loss limitations in 2023.

Item AC22-12-05 Study of Paid and Incurred Loss Development

Historically, the WCIRB has projected loss development primarily using paid loss development factors rather than incurred loss development factors. Although the WCIRB reviews several loss development projection methodologies including those based on incurred development in preparation for the pure premium rate filings, a comprehensive retrospective review of paid and incurred loss development has not been undertaken in some time. The WCIRB's prior retrospective testing study of loss development methodologies conducted in 2014 found that paid loss development was generally more accurate and stable than incurred loss development in the periods reviewed.¹ Since that time, there have been a number of system reforms and a worldwide pandemic impacting the California workers' compensation system. Staff has conducted an initial retrospective review of unadjusted paid and incurred loss development methodologies with data from recent accident years to assess if the findings from prior studies hold.

Paid and Incurred Loss Data

Staff considered loss data from accident years 2014 through 2019 in this study, based on experience through December 31, 2021. This continues from where the 2014 study left off but does not include accident year 2020 which is heavily impacted by the COVID-19 pandemic. Losses are developed to the current age of the accident year as of December 31, 2021 (e.g., 96 months for accident year 2014). It is possible that the results of this study would differ somewhat if later period loss development was considered, as the acceleration in claim settlement rates over the last several years has significantly impacted later period loss development.

Development Methodologies and Approach

In evaluating unadjusted paid and incurred loss development, the following methods were considered in the retrospective tests of actual versus expected development.

- Latest Year Age-to-Age Loss Development Factor (LDF)
- 3-Year Average LDF
- 5-Year Average LDF Excluding Highest and Lowest LDF²

Although the WCIRB's current paid loss development methodology for medical includes adjustments for reforms, the most significant of those were effective in 2019 (for pharmaceutical cost changes) and 2021 (for changes to medical fee schedules). Since there are few observations with those adjustments available for retrospective testing, the reform-adjusted method was not included in this initial analysis. In addition, the claim settlement rate-adjusted method was also not included due to the complexity in retrospectively testing this approach. As a result, the results of this initial retrospective study are based on the unadjusted methods only.

Analysis Approach

The retrospective tests of the actual versus expected development were conducted based on comparing the projected age-to-age factors with the actual emerging age-to-age development. For example, under the latest year assumption, data is expected to develop in the same pattern as the immediate year prior. As shown in Figure 1, using incurred medical data for accident year 2019 as an example, the latest year development projection for 12 to 24 months is 1.449. The actual development is 1.452, which results in a -0.002 (=1.449/1.452-1) difference between actual vs. expected.

¹ See Item AC14-03-03 of the March 19, 2014 and June 11, 2014 Actuarial Committee Agendas.

² This is similar to that of the 3-year average method but 5 years of LDFs were considered, where 3 out of the 5 years of LDFs were used excluding the highest and the lowest LDFs to mitigate large fluctuation in the data.

ccident		U	0
Year	12 - 24	24 - 36	36 - 48
2017	1.400	1.117	1.051
2018	1.449	1.110	
2019	1.452		

Figure 1: Incurred Medical Age-to-Age Factors

As development age increases, we take the average of actual vs. expected results from all available projections. At age 12-to-24 months, there is one result from the projection from 12 months. At age 24-to-36 months, there are two projections, one made at 12 months and one made at 24 months. For example, in Figure 1, the accident year 2019 latest year projection for 24-to-36 months is 1.117 when 2019 is at 12 months and 1.110 when 2019 is at 24 months. The actual vs. expected comparison is averaged from each of the two projections. The same consideration is carried through 84-to-96 months (where there are seven projections, one made at each of the prior ages).

Initial Results

For the indemnity and medical actual vs. expected comparisons, results by accident year are shown in Exhibits 1.1 through 1.7. Exhibit 1.7 shows the average across all accident years tested. Comparison by development age is shown in Exhibits 2.1 through 2.8. Exhibit 2.8 shows the average over all development ages tested. For indemnity, the unadjusted incurred methods initially show smaller root mean square error (rMSE) and low coefficient of variation (CV) between actual vs. expected across accident years and development ages tested. For medical, the unadjusted paid and incurred methods show mixed results in various accident years and development ages. Within medical, the unadjusted Latest Year methods outperform the 3-Year Average and 5-Year Excluding High and Low with smaller rMSE, but usually accompanied with greater CV.

As mentioned above, this initial study does not consider development after 96 months. For incurred development in particular, there has been recent flat-to-negative incurred development at later periods, particularly for medical, over the last several calendar years. Further, the WCIRB reflects several adjustments to paid loss development for system changes impacting loss development patterns, such as reforms and claim settlement rates. While the WCIRB has reasonable approaches for adjusting for these phenomena in paid development, they are much more challenging to address in incurred development which includes insurer case reserves. Staff recommends continuing to review these approaches particularly for later periods and including reviewing the adjusted paid methods. Staff also recommends reviewing other criteria considered in selecting the loss development methodology such as the stability of projections and the variability of development across insurers.

Comparison of Actual vs. Expected Age-to-Age Development	ACCIUENT LEAT 2014
----------------------------------------------------------	--------------------

	parkline		$\left\langle \right\rangle$	$\left\langle \right\rangle$						parkline						
	S									S	\rangle					
	S	6.122	0.423	0.276	6.920	2.761	2.951			S	0.478	0.494	0.397	1.057	0.436	
	rMSE	0.009	0.009	0.012	0.014	0.016	0.017			rMSE	0.017	0.033	0.038	0.014	0.017	
	84 - 96	0.007	0.008	0.009	0.011	0.014	0.015			84 - 96	0.007	0.011	0.016	0.010	0.014	
	72 - 84	0.008	0.011	0.013	0.016	0.019	0.020			72 - 84	0.012	0.018	0.024	0.017	0.021	
(in months	60 - 72	0.011	0.013	0.016	0.014	0.017	0.018	al	(in months	60 - 72	0.011	0.019	0.026	0.015	0.019	
erience from	48 - 60	0.003	0.007	0.010	0.009	0.014	0.015	Medic	srience from	48 - 60	0.024	0.035	0.041	0.019	0.024	
sed on Expe	36 - 48	0.004	0.010	0.014	0.005	0.010	0.011		sed on Expe	36 - 48	0.020	0.035	0.043	0.015	0.020	
Ba	24 - 36	(0.007)	0.002	0.007	(0.020)	(0.016)	(0.015)		Ba	24 - 36	0.009	0.038	0.049	0.003	0.004	
	12 - 24	(0.015)	0.007	0.015	(0.019)	(0.018)	(0.023)			12 - 24	0.024	0.054	0.054	(0.010)	0.010	
Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid		Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	

omparison of Actual vs. Expected Age-to-Age Develc Accident Year 2015

	Sparkline									Sparkline		\langle	/				
	CV	0.926	0.789	0.400	1.719	3.301	2.505			CV	0.413	0.258	0.311	0.759	0.644	0.636	
	rMSE	0.009	0.012	0.016	0.014	0.020	0.022			rMSE	0.014	0.027	0.041	0.017	0.021	0.023	
	72 - 84	0.005	0.007	0.010	0.009	0.013	0.016			72 - 84	0.011	0.017	0.022	0.012	0.016	0.019	
onths)	60 - 72	0.010	0.013	0.016	0.022	0.026	0.029		onths)	60 - 72	0.014	0.021	0.028	0.023	0.028	0.031	
e trom (in m	48 - 60	0.012	0.015	0.018	0.014	0.019	0.022	Medical	e from (in m	48 - 60	0.019	0:030	0.039	0.021	0.028	0.031	
I Experience	36 - 48	0.011	0.017	0.023	0.013	0.016	0.019		1 Experience	36 - 48	0.020	0.035	0.049	0.016	0.022	0.024	
Based or	24 - 36	0.007	0.009	0.016	0.002	(0.006)	(0.003)		Based or	24 - 36	0.007	0.026	0.048	0.017	0.019	0.019	
	12 - 24	(0.005)	(0.004)	0.007	(0.015)	(0:030)	(0.031)			12 - 24	0.008	0.031	0.053	(0.006)	(0.004)	(0.004)	
Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid		Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid	

	Sparkline	/			\langle					Sparkline						
	CV	0.355	0.375	0.222	0.282	0.688	0.919			S	0.636	0.410	0.342	0.238	0.348	0.247
	rMSE	0.013	0.014	0.019	0.020	0.020	0.024			rMSE	0.019	0.027	0.040	0.024	0.028	0.034
<u> </u>	60 - 72	0.007	0.011	0.014	0.014	0.020	0.024		<u> </u>	60 - 72	0.009	0.015	0.022	0.014	0.020	0.026
n (in months	48 - 60	0.010	0.013	0.016	0.023	0.028	0.033	cal	n (in months	48 - 60	0.009	0.018	0.029	0.025	0.032	0.039
erience fron	36 - 48	0.013	0.017	0.022	0.019	0.023	0.028	Medi	erience fron	36 - 48	0:030	0.041	0.054	0.026	0.034	0.040
ised on Exp	24 - 36	0.018	0.018	0.023	0.026	0.019	0.018		ised on Exp	24 - 36	0.025	0.031	0.048	0.029	0.035	0.039
Ba	12 - 24	0.014	0.006	0.017	0.013	(0.003)	(0.010)		Ba	12 - 24	0.009	0.022	0.040	0.021	0.014	0.023
Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid		Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid

	Sparkline	$\langle \rangle$	/	(Sparkline					/	
	CV	0.295	0.262	0.181	0.434	0.353	0.549			S	0.811	0.532	0.433	0.527	0.398	0.290
	rMSE	0.012	0.019	0.022	0.020	0.026	0.027			rMSE	0.023	0.031	0.042	0:030	0.042	0.048
nonths)	48 - 60	0.008	0.012	0.016	0.009	0.016	0.022		nonths)	48 - 60	0.007	0.014	0.022	0.010	0.019	0.028
e from (in n	36 - 48	0.014	0.019	0.024	0.028	0.035	0.040	Medical	e from (in n	36 - 48	0.011	0.023	0.035	0.031	0.042	0.050
n Experienc	24 - 36	0.010	0.018	0.022	0.021	0.030	0.026		n Experienc	24 - 36	0.016	0.027	0.037	0.024	0.040	0.049
Based or	12 - 24	0.016	0.024	0.024	0.016	0.020	0.008		Based or	12 - 24	0.040	0.049	0.063	0.045	0.058	0.060
Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid		Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid

_	-
<u> </u>	
Ξ	
e	
2	
-	

:	Sparkline		(\langle	((\langle			Sparkline		/	/	\langle	/	/
į	S	0.401	0.105	0.085	0.702	0.490	0.372			2 C	9.110	0.425	0.348	2.128	0.457	0.358
	rMSE	0.010	0.020	0.024	0.024	0.038	0.039			rMSE	0.007	0.020	0.033	0.010	0.029	0.043
n months)	36 - 48	0.011	0.018	0.023	0.005	0.016	0.025		n months)	36 - 48	(0.001)	0.010	0.020	(000.0)	0.013	0.024
berience from (i	24 - 36	0.013	0.022	0.026	0.034	0.050	0.052	Medical	verience from (i	24 - 36	0.009	0.023	0.032	0.016	0.034	0.049
Based on Exp	12 - 24	0.005	0.021	0.023	0.024	0.039	0.034		Based on Exp	12 - 24	(0.006)	0.023	0.043	(0.002)	0.035	0.050
Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid		Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid

	Sparkline			/	/	/	/			Sparkline	/	/	/	/	/	/
	CV	0.972	0.072	0.100	1.746	0.542	0.345			S S	(0.902)	1.818	0.608	(3.579)	6.541	1.537
	rMSE	0.002	0.010	0.018	0.011	0.029	0.041			rMSE	0.007	0.005	0.018	0.023	0.023	0.034
om (in months)	24 - 36	0.003	0.010	0.017	(0.002)	0.017	0.030	dical	om (in months)	24 - 36	(0.00)	(0.001)	0.009	(0:030)	(0.017)	(0.002)
Based on Experience fr	12 - 24	0.001	0.009	0.020	0.015	0.037	0.050	Me	Based on Experience fr	12 - 24	(0.002)	0.007	0.023	0.013	0.027	0.048
Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid		Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid

Source: WCIRB aggregate financial data

Comparison of Actual vs. Expected Age-to-Age Development Accident Years 2014-2019 Average

Development		B	ased on Exp	erience froi	n (in months	(1				
Methodology	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - 96	rMSE	S	Sparkline
Latest Year Incurred	0.003	0.007	0.010	0.008	0.009	0.006	0.007	0.008	0.340	
3-Year Avg. Incurred	0.010	0.013	0.016	0.012	0.012	0.00	0.008	0.012	0.237	
5-Year Excl. Hi-Lo Incurred	0.017	0.019	0.021	0.015	0.015	0.011	0.009	0.016	0.269	
Latest Year Paid	0.006	0.010	0.014	0.014	0.017	0.013	0.011	0.012	0.289	
3-Year Avg. Paid	0.007	0.016	0.020	0.019	0.021	0.016	0.014	0.017	0.284	
5-Year Excl. Hi-Lo Paid	0.005	0.018	0.025	0.023	0.024	0.018	0.015	0.019	0.380	
				Med	ical					
Development		B	ased on Exp	erience froi	n (in months	(1				
Methodology	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72	72 - 84	84 - 96	rMSE	S	Sparkline
Latest Year Incurred	0.012	0.010	0.016	0.015	0.011	0.012	0.007	0.012	0.268	$\left\langle \right\rangle$
3-Year Avg. Incurred	0.031	0.024	0.029	0.024	0.018	0.017	0.011	0.023	0.314	
5-Year Excl. Hi-Lo Incurred	0.046	0.037	0.040	0.033	0.025	0.023	0.016	0.033	0.337	
Latest Year Paid	0.010	0.010	0.018	0.019	0.017	0.015	0.010	0.015	0.281	
3-Year Avg. Paid	0.023	0.019	0.026	0.026	0.022	0.019	0.014	0.022	0.212	\langle
5-Year Excl. Hi-Lo Paid	0.029	0.026	0.031	0:030	0.026	0.021	0.016	0.026	0.212	(

Development			Accident	: Year					
Methodology	2014	2015	2016	2017	2018	2019	rMSE	CV	Sparkline
Latest Year Incurred	(0.015)	(0.005)	0.014	0.016	0.005	0.001	0.011	4.219	
3-Year Avg. Incurred	0.007	(0.004)	0.006	0.024	0.021	0.009	0.014	0.979	$\langle \rangle$
5-Year Excl. Hi-Lo Incurred	0.015	0.007	0.017	0.024	0.023	0.020	0.018	0.359	$\langle \rangle$
Latest Year Paid	(0.019)	(0.015)	0.013	0.016	0.024	0.015	0.017	3.079	
3-Year Avg. Paid	(0.018)	(0:030)	(0.003)	0.020	0.039	0.037	0.028	3.890	
5-Year Excl. Hi-Lo Paid	(0.023)	(0.031)	(0.010)	0.008	0.034	0.050	0.030	6.753	
				Medical					
Development		Ac	cident Year						
Methodology	2014	2015	2016	2017	2018	2019	rMSE	S	Sparkline
Latest Year Incurred	0.024	0.008	0.009	0.040	(0.006)	(0.002)	0.020	1.434	
3-Year Avg. Incurred	0.054	0.031	0.022	0.049	0.023	0.007	0.035	0.571	$\langle \rangle$
5-Year Excl. Hi-Lo Incurred	0.054	0.053	0.040	0.063	0.043	0.023	0.048	0.301	\langle
Latest Year Paid	(0.010)	(0.006)	0.021	0.045	(0.002)	0.013	0.022	2.045	
3-Year Avg. Paid	0.010	(0.004)	0.014	0.058	0.035	0.027	0.031	0.921	$\langle \rangle$
5-Year Excl. Hi-Lo Paid	(0.003)	(0.004)	0.023	090.0	0.050	0.048	0.038	0.958	



III-A-10 Workers' Compensation Insurance Rating Bureau of California®

			<u> </u>	ndemnity					
Development			Accident	Year					
Methodology	2014	2015	2016	2017	2018	2019	rMSE	S	Sparkline
Latest Year Incurred	(200.0)	0.007	0.018	0.010	0.013	0.003	0.011	1.215	
3-Year Avg. Incurred	0.002	0.009	0.018	0.018	0.022	0.010	0.015	0.548	
5-Year Excl. Hi-Lo Incurred	0.007	0.016	0.023	0.022	0.026	0.017	0.020	0.364	
Latest Year Paid	(0.020)	0.002	0.026	0.021	0.034	(0.002)	0.021	2.039	
3-Year Avg. Paid	(0.016)	(0.006)	0.019	0.030	0.050	0.017	0.027	1.518	
5-Year Excl. Hi-Lo Paid	(0.015)	(0.003)	0.018	0.026	0.052	0.030	0.028	1.336	
			-	Medical					
Development		Acc	cident Year						
Methodology	2014	2015	2016	2017	2018	2019	rMSE	CV	Sparkline
Latest Year Incurred	0.00	0.007	0.025	0.016	0.009	(0.00)	0.014	1.192	\langle
3-Year Avg. Incurred	0.038	0.026	0.031	0.027	0.023	(0.001)	0.027	0.547	
5-Year Excl. Hi-Lo Incurred	0.049	0.048	0.048	0.037	0.032	0.009	0.040	0.411	
Latest Year Paid	0.003	0.017	0.029	0.024	0.016	(0:030)	0.022	2.226	
3-Year Avg. Paid	0.004	0.019	0.035	0.040	0.034	(0.017)	0.028	1.163	
5-Year Excl. Hi-Lo Paid	0.001	0.019	0.039	0.049	0.049	(0.002)	0.034	0.892	
Source: WCIRB aggregate financi	al data								

Actuarial Committee Meeting Agenda for December 8, 2022

Comparison of Actual vs. Expected Age-to-Age Development Development Period 24 - 36 Months

III-A-11 Workers' Compensation Insurance Rating Bureau of California®

2015 2016 2017 2018 rMSE CV Sparkline 20 0.020 0.030 0.011 (0.001) 0.019 0.712 Sparkline 35 0.035 0.011 (0.001) 0.031 0.438 9.712 43 0.049 0.054 0.035 0.020 0.042 0.355 15 0.016 0.031 (0.000) 0.021 0.682 20 0.022 0.034 0.031 (0.000) 0.021 0.682 20 0.022 0.034 0.020 0.028 0.436 20 0.024 0.033 0.028 0.436
20 0.020 0.030 0.011 (0.001) 0.019 0.712 35 0.035 0.041 0.023 0.010 0.031 0.438 43 0.049 0.054 0.035 0.020 0.042 0.325 15 0.016 0.031 (0.000) 0.021 0.682 20 0.022 0.034 0.042 0.013 0.028 0.436 16 0.022 0.034 0.042 0.013 0.028 0.436 20 0.022 0.040 0.050 0.013 0.028 0.436 18 0.024 0.023 0.033 0.024 0.033 0.428
35 0.035 0.041 0.023 0.010 0.031 0.438 43 0.049 0.054 0.035 0.020 0.042 0.325 15 0.016 0.026 0.031 (0.000) 0.021 0.682 20 0.022 0.034 0.042 0.013 0.028 0.436 20 0.022 0.034 0.042 0.013 0.028 0.436 20 0.024 0.023 0.028 0.436 0.436
13 0.049 0.054 0.035 0.020 0.042 0.325 15 0.016 0.026 0.031 (0.000) 0.021 0.682 20 0.022 0.034 0.013 0.028 0.436 18 0.024 0.050 0.024 0.033 0.428
15 0.016 0.026 0.031 (0.000) 0.021 0.682 20 0.022 0.034 0.042 0.013 0.028 0.436 18 0.024 0.050 0.024 0.033 0.428 0.436
20 0.022 0.034 0.042 0.013 0.028 0.436 0.136 18 0.024 0.050 0.024 0.023 0.428 0.136
18 0.024 0.050 0.024 0.033 0.428

Development		Accident	: Year				
Methodology	2014	2015	2016	2017	rMSE	CV	Sparkline
Latest Year Incurred	0.003	0.012	0.010	0.008	0.009	0.472	
3-Year Avg. Incurred	0.007	0.015	0.013	0.012	0.012	0.292	
5-Year Excl. Hi-Lo Incurred	0.010	0.018	0.016	0.016	0.015	0.246	
Latest Year Paid	0.009	0.014	0.023	0.009	0.015	0.480	\langle
3-Year Avg. Paid	0.014	0.019	0.028	0.016	0.020	0.327	\langle
5-Year Excl. Hi-Lo Paid	0.015	0.022	0.033	0.022	0.024	0.334	\langle
			Medical				
Development		Accident	: Year				
Methodology	2014	2015	2016	2017	rMSE	S	Sparkline
Latest Year Incurred	0.024	0.019	0.009	0.007	0.016	0.576	
3-Year Avg. Incurred	0.035	0:030	0.018	0.014	0.026	0.406	
5-Year Excl. Hi-Lo Incurred	0.041	0.039	0.029	0.022	0.034	0.266	
Latest Year Paid	0.019	0.021	0.025	0.010	0.020	0.330	
3-Year Avg. Paid	0.024	0.028	0.032	0.019	0.026	0.214	
5-Year Excl. Hi-Lo Paid	0.024	0.031	0.039	0.028	0.031	0.208	
	-						

	Sparkline	/	/	/	\langle	\langle				Sparkline		(\langle		
	S	0.231	0.123	0.086	0.287	0.236	0.226			CV	0.190	0.157	0.122	0.274	0.222	0.214	
	rMSE	0.009	0.012	0.015	0.017	0.021	0.024			rMSE	0.012	0.018	0.025	0.018	0.023	0.026	
L	2016	0.007	0.011	0.014	0.014	0.020	0.024	cal	L	2016	600.0	0.015	0.022	0.014	0.020	0.026	
cident Year	2015	0.010	0.013	0.016	0.022	0.026	0.029	Medi	cident Year	2015	0.014	0.021	0.028	0.023	0.028	0.031	
Ac	2014	0.011	0.013	0.016	0.014	0.017	0.018		Ac	2014	0.011	0.019	0.026	0.015	0.019	0.020	
Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid		Development	Methodology	Latest Year Incurred	3-Year Avg. Incurred	5-Year Excl. Hi-Lo Incurred	Latest Year Paid	3-Year Avg. Paid	5-Year Excl. Hi-Lo Paid	

Development	Accident	t Year			
Methodology	2014	2015	rMSE	S	Sparkline
Latest Year Incurred	0.008	0.005	0.007	0.363	/
3-Year Avg. Incurred	0.011	0.007	0.009	0.266	/
5-Year Excl. Hi-Lo Incurred	0.013	0.010	0.011	0.194	/
Latest Year Paid	0.016	0.009	0.013	0.353	/
3-Year Avg. Paid	0.019	0.013	0.016	0.272	/
5-Year Excl. Hi-Lo Paid	0.020	0.016	0.018	0.188	/
		Medical			
Development	Accident	t Year			
Methodology	2014	2015	rMSE	CV	Sparkline
Latest Year Incurred	0.012	0.011	0.012	0.056	/
3-Year Avg. Incurred	0.018	0.017	0.017	0.058	/
5-Year Excl. Hi-Lo Incurred	0.024	0.022	0.023	0.058	/
Latest Year Paid	0.017	0.012	0.015	0.271	/
3-Year Avg. Paid	0.021	0.016	0.019	0.174	/
5-Year Excl. Hi-Lo Paid	0.023	0.019	0.021	0.126	/
Source: WCIRB aggregate financia	al data				

1 mobul

паетпик	
Development	Accident Year
Methodology	2014
Latest Year Incurred	0.007
3-Year Avg. Incurred	0.008
5-Year Excl. Hi-Lo Incurred	0.00
Latest Year Paid	0.011
3-Year Avg. Paid	0.014
5-Year Excl. Hi-Lo Paid	0.015
Medical	
Development	Accident Year
Methodology	2014
Latest Year Incurred	0.007
3-Year Avg. Incurred	0.011
5-Year Excl. Hi-Lo Incurred	0.016

			=						
Development			Accident	: Year					
Methodology	2014	2015	2016	2017	2018	2019	rMSE	CV	Sparkline
Latest Year Incurred	0.002	0.007	0.012	0.012	0.010	0.002	0.009	0.671	
3-Year Avg. Incurred	0.008	0.010	0.013	0.018	0.020	0.010	0.014	0.377	
5-Year Excl. Hi-Lo Incurred	0.012	0.015	0.018	0.021	0.024	0.018	0.019	0.237	
Latest Year Paid	0.002	0.008	0.019	0.018	0.021	0.007	0.014	0.632	
3-Year Avg. Paid	0.006	0.006	0.017	0.025	0.035	0.027	0.022	0.609	$\langle \rangle$
5-Year Excl. Hi-Lo Paid	0.006	0.009	0.018	0.024	0.037	0.040	0.026	0.633	
			_	Medical					
Development		Ac	cident Year						
Methodology	2014	2015	2016	2017	2018	2019	rMSE	S	Sparkline
Latest Year Incurred	0.015	0.013	0.016	0.019	0.001	(0.006)	0.013	1.004	/
3-Year Avg. Incurred	0.030	0.027	0.025	0.028	0.019	0.003	0.024	0.455	
5-Year Excl. Hi-Lo Incurred	0.036	0.040	0.038	0.039	0.032	0.016	0.035	0.266	
Latest Year Paid	0.010	0.014	0.023	0.028	0.005	(0.009)	0.017	1.112	/
3-Year Avg. Paid	0.016	0.018	0.027	0.040	0.028	0.005	0.025	0.537	
5-Year Excl. Hi-Lo Paid	0.014	0.020	0.033	0.047	0.041	0.023	0.032	0.429	

Comparison of Actual vs. Expected Age-to-Age Development Development Period 12 - 96 Month Average

Indemnity

III-A-17 Workers' Compensation Insurance Rating Bureau of California®

Item AC22-12-01 Retrospective Rating Plan Updates

Update Schedule

Staff has begun the process of making a full update to the advisory Retrospective Rating Plan (Plan). The last full update to the Plan was effective January 1, 2019. The plan tables are updated annually for current trend and benefit on-level selections, to roll the simulation database forward to the next policy year. The full update cycle will last throughout 2022, 2023, and early 2024. The updated Plan will be filed in February 2024 as part of the September 1, 2024 Regulatory Filing, with the Plan to be effective at that time.

Staff anticipates updating and enhancing the current methodologies and also adding new informational artifacts using the following approximate timeline:

August 2022 (ARWG Meeting)

- Present background on the current development of the Plan.
- Discuss potential enhancements of the current process and solicit Actuarial Research Working Group (ARWG) feedback to determine which options staff will investigate.
- Present background on the Plan to implement paid development artifacts.
- Present preliminary results of current methodology using updated data sources.
- Preliminary discussion of Plan update process, update frequency, data-driven vs. methodological updates, etc.

Fall 2022

• Staff development and testing of potential incurred development enhancements as selected at the August 2022 ARWG meeting.

November 2022 (ARWG Meeting)

- Present findings on incurred development enhancements.
- Select ARWG recommended incurred development methodologies.

December 2022 (AC Meeting)

- Present ARWG findings and recommendations to the Actuarial Committee (AC)
- Solicit AC general acceptance of incurred development methodology.

Spring 2023

- Staff coding and implementation of paid development methodology.
- Staff investigation and update of current ALAE selection methodology.
- Staff will potentially revisit unsuccessful ALAE development methodology.

May/June 2023 (ARWG Meeting)

- Present issues and findings of new paid development methodology.
- Present investigation of ALAE selection and/or development methodologies.
- Consider ARWG feedback on for paid development and ALAE determination.
- Solicit ARWG feedback regarding any new incurred development, paid development, and ALAE data artifacts to be included with the final Plan files.

June 2023 (AC Meeting)

- Present ARWG findings and staff recommendations for paid development and ALAE selection to the AC.
- Solicit AC general acceptance of these methodologies.

Summer/Fall 2023

- Staff implementation of all selected methodologies using updated data sources.
- Staff updating and testing of hazard group selection methodology.

October 2023 (ARWG Meeting)

- Present hazard group selection investigation.
- Consider ARWG feedback on staff recommended hazard group assignments or hazard group selection methodology.
- Revisit discussion of plan update frequency considering all selected methodologies solicit ARWG feedback.

December 2023 (AC Meeting)

- Present staff hazard group recommendations to AC for feedback.
- Solicit AC general acceptance on staff hazard group selections.

Winter 2023

- Staff finalizes trend and on-level factors for final Plan update.
- Staff develops all Plan updates, including loss elimination ratios and tables of insurance charges.

February 2024

• Submit finalized plan as part of the September 1, 2024 Regulatory Filing.

As noted, this schedule is tentative. Many of these items need to be completed sequentially. Should the ARWG or Committee not finalize a decision according to the schedule above, those items would be revisited at a future date.

Retrospective Rating Plan Background

The 2019 California Retrospective Rating Plan and annual updates to the Plan tables are based on a database of individual claim simulations at ultimate value, adjusted to the cost level of the policy period for which the Plan is effective. Following is a brief description of the derivation of the retro simulation database, hazard groupings, and rating Plan tables. For more detailed information, reference the 2019 California Retrospective Rating Plan Technical Documentation.¹

Historical Starting Database

The retro database is developed from recent policy years of unit statistical report (USR) data of sufficient maturity. Policy years at first and second report levels of maturity have generally been found not to be of sufficient maturity to serve as the basis for retro database development. The starting database underlying the 2019 policy year parameters includes policy years 2009 at fifth report level; 2010 at fourth report level; and 2011 at third report level.

Simulation Process

The historical starting database undergoes loss development through claim closure by creating a detailed model of the life of each claim. Each claim is developed using a Monte Carlo simulation. The simulation models individual claim activity between successive maturities. At each maturity, the state of a claim is determined by its open/closed status, incurred medical losses, and incurred indemnity losses. Based on these characteristics, the state of a claim may change in two ways:

- 1. The open/closed status of a claim may change.
- 2. Depending on the potentially new open/closed status of the claim, the indemnity and medical components of incurred loss may develop.

This basic process is carried out iteratively until claim closure. A more detailed look at this process is shown visually in Exhibit 1. For the 2019 update, the length of the simulation was increased to a maturity of 100 years from the previously used 50 years. It is possible for individual claim simulations to remain

¹ <u>https://wcirb.com/document/43786</u>

open for the entirety of the development process. In that case, claim values at a maturity of 100 years are treated as ultimate. In order to produce a credible body of claim simulations to reflect individual hazard groups at all maturities in the simulation process, each claim is simulated multiple times. For the 2019 update, the number of claim simulations was increased to 100 per claim from the previously used five.

Development Tables

The age-to-age claim development described above is achieved using empirically based distributions of claim open/closed status changes and loss development. The tables of changes in open/closed status are dependent on a claim's size (as determined by total incurred losses), maturity, and current open/closed status. Tables of loss development are further dependent on whether a claim remains open, closes, reopens, etc. These empirical tables are derived from two data sources. Early development tables are based on USR data. USR data is available through report level 10, which is valued at 126 months. Claim development tables from 126 months to ultimate are based on data from the Long-Term Loss Development Survey (LTLDS). This survey collects data on all post-USR claims open at any point during the most recent three calendar years and provides claim values at the most recent four calendar year ends. Due to sparse data, development tables past 30 years maturity are based on all available data of maturity 30 years or greater. In these development tables, loss development is identical but claim closing rates are adjusted to ensure that closing rates increase monotonically with maturity. At this point in the process, each claim in the starting database has been brought to an ultimate level for 100 unique simulations.

Adjusting Claims to Level of the Effective Policy Period

The ultimate values resulting from the claim simulation process are further adjusted to reflect differences in cost levels between the starting database and the effective policy period. Each simulation's ultimate indemnity and medical values are adjusted using the most recent available benefit on-level factors, which vary by accident year and injury type. Simulated values are further adjusted using the most recently selected indemnity and medical trend values, which vary by accident year. Previous studies found that trend levels varied by claim size. This is reflected in the trend adjustments by use of what the WCIRB has termed vector trend. Via the vector trend, the smallest and largest claims are trended less than the selected aggregate trend while medium sized claims are trended more than the aggregate selection. Now all claim simulations have been brought to an ultimate level and adjusted to the cost level of the effective policy period.

Adjusting from per Claim to per Accident Cost Levels

There is a small adjustment to bring the retro database to the per accident values published in the Plan tables. This is achieved by grouping together claims from the starting database that arise from the same policy and share a common catastrophe number in their USR records. Claims arising from a common accident are simply summed together.

Extreme Value Smoothing

Claim simulations above the large loss limit, currently \$2,000,000, are smoothed to reflect the sparsity of data in the highest layers and ensure that no hazard group is unduly impacted by a single extreme simulation. (Hazard groups will be impacted by the frequency of excess simulations, but not by the values of these simulations.) A Pareto distribution is used to smooth simulated loss values in excess of the large loss limit. This effectively treats each simulation in excess of the large loss limit as a fraction of a simulation at the Pareto-midpoint² of each published excess loss layer.

² For example, the Pareto-midpoint of the \$5,000,000 to \$6,000,000 will be slightly less than \$5.5M. For any layer, the Pareto-midpoint will be slightly less than the arithmetic midpoint due to the shape of the Pareto distribution.

Retro Hazard Group (RHG) Selection

Classifications are placed into hazard groups based on their size of loss distribution in the final retro database. For the 2019 update, classification loss elimination ratios at the \$500,000 loss limit were used to group classifications via k-means cluster analysis. The \$500,000 loss limit was chosen primarily due to its use in classification ratemaking.³ This loss limit is also roughly the point with the greatest variance among hazard group (or classification) loss elimination ratios. Prior to their use in the cluster analysis, classification loss elimination ratios were credibility-weighted with the loss elimination ratio of their current hazard group. The credibilities were based on the excess \$500,000 count shares for "large" classifications, with large defined as the size at which all classifications with equal or greater claim volume resulted in at least one excess \$500,000 claim simulation in all 100 simulations. Excess count shares for these large classifications were deemed reasonable.

Potential Incurred Development Enhancements

Development Table Calendar Year Sampling

The tables used to simulate claim development to ultimate are currently built using an all-year average of available data. In order to test the inclusion, exclusion, or alternate weighting of the available calendar years of data, staff developed a methodology to apply any desired weight to each calendar year. As an input, the methodology requires a relative weight for each year. The current methodology is equivalent to applying any equal weight to each year. A weight of one was used for simplicity.

Data Underlying Simulation Tables

Before applying any alternate weights in the compilation of the development tables, staff first investigated the underlying empirical data. The intent of the investigation was to get a broad sense of whether a calendar year diagonal exhibited high or low development potential, as applicable to the claim simulation process. Since the simulation process models development of individual claims, staff was less interested in aggregate development measures and more interested in measures that impact individual claims.

Staff separated these measures into two segments, claim development and claim closing rates. Staff arrived at two measures of claim development that would be predictive of whether an individual year's data would increase or decrease the potential for simulated large claims. The first of these measures is the share of claims that don't develop during the calendar year, with higher shares being correlated with lower potential for large claims. The second measure is the ratio of claims developing upward to claims developing downward during the calendar year, with lower ratios being correlated with lower potential for large claims. Both of these measures show lower potential for large simulated claims in the most recent several years. These are shown in Exhibit 2. The exhibit shows these measures for USR maturities (development up to 126 months), survey maturities (development after 126 months), and all maturities combined. Of particular note is the ratio of upward to downward development at early maturities. These ratios have actually been less than unity during the last four years. This only occurred once in the prior 15 years.

Staff's investigation of closing rates also indicated a reduced potential for large simulated claims in the more recent data as closing rates have been high. These are shown in Exhibit 3. In fact, at earlier maturities the most recent eight years have the eight highest closing rates using this measure. (The database used largely pre-dates the claim settlement slowdown that occurred during the pandemic.)

These measures were intended to give an overall snapshot of each calendar year. The actual development tables are segmented by claim size and maturity, whereas they are combined in these exhibits. Staff also looked at these measures at a more atomistic level and found similar results, though there were considerable variability as certain claim size/maturity cells are sparsely populated.

³ For classification ratemaking, limited loss values are brought to an unlimited value using limit factors derived from the retro database.

Sensitivity Testing

While the measures described above offer insights into potential differences in the simulated size of loss distribution, staff tested the impact directly by running a limited (10 simulations per claim instead of 100 as for a full simulation) simulation excluding each calendar year. The limited simulation yields results that are consistent with, but more variable than, a full simulation. These simulations directly measure the combined impact of a given year's closing rates and development, including differences by claim size and maturity. The resulting loss elimination ratios are largely consistent with the patterns shown in Exhibits 2 and 3. The exclusion of years showing lower large simulation potential generally result in higher loss elimination ratios. These results are fairly consistent across loss limits and are shown in Exhibit 4. This exhibit is shown as a heat map with separate color coding for each loss limit. Higher loss elimination ratios are shown in blue to represent the excluded year was "cold" in terms of its impact on the simulated size of loss distribution. While the closing rates and development patterns observed over the available calendar years varied considerably, the impact of excluding any individual year was small. This mitigates the potential for the simulated size of loss distribution to be distorted by the use of an additional atypical year when using an all-year average to compile the development tables.

Staff also tested two options for giving more weight to the more recent calendar years when building the development tables. The first option tested simply used only the most recent five years to build the simulation tables while the second gave the most recent five years twice as much weight as the prior years. Both methods resulted in considerably lower loss elimination ratios, particularly the option that only used the most recent five years. This is consistent with the lower potential for development for the calendar years shown in Exhibits 2 and 3. These results are shown in Exhibit 5.

Alternate Weightings

Staff investigated a few other methods for determining calendar year weights. These included measuring how "normal" a given year was using the measures shown in Exhibits 2 and 3 as well as measuring the reserve share of total incurred on open claims. All of these options resulted in calendar year weights that followed no pattern over time. Staff considered these weights both arbitrary and unintuitive and they were not investigated further.

Given these findings, staff recommended continuing to use an all-year average to build the simulation tables at the ARWG. This will allow all observed development patterns to be built into the simulation in the proportion in which they occurred. This will allow simulated development to be based on many different development environments without allowing shorter term trends to drive the simulation. The ARWG was generally supportive of staff's recommendation.

Alternative Starting Database

The ARWG discussed developing the starting database using bootstrapping to bulk up the body of claims to a minimum level for each classification. The primary investigation for this approach would be to determine how to bulk up the claim volume for small classifications. The additional claims could potentially come from the same classification in other years, from similar (in terms of size of loss distribution) classifications in the same year or drawn from a distribution. This approach would also require the selection of appropriate classification weights. Several ARWG members expressed interest in this idea, but complexities in selecting the appropriate sample to bootstrap from were deemed too onerous to move forward with this approach at this time.

Paid Development Module

Once decisions are reached on the incurred loss methodology, staff will shift gears towards implementing the paid loss development methodology.⁴ This is not a true paid development methodology. At each maturity, incurred loss development is determined. A portion of the remaining case reserve is then simulated to be paid again based on empirically derived tables.

Updates to the Retrospective Rating Plan

Current Update Process

The WCIRB Retrospective Rating Plan is currently updated roughly every five or six years. The current Plan was effective January 1, 2019. The Plan's loss elimination ratios, tables of insurance charges, and other supplementary tables are updated annually. These updates use the same simulation database underlying the current Plan. The only differences in the databases are that these have been adjusted using trend and on-level factors for the corresponding policy period. The overall ALAE load is also updated annually.

Potential Changes to Simulation Database Update Process

Given that the simulation database is built from a starting point of historic USR data, there is a potential disconnect between the classification mix of this starting database and that of the future year for which the loss elimination ratios will be used.

To address this, staff developed a method to adjust the simulation database to the classification mix of used for the future period. This method reweights each claim in the simulation database to reflect the difference between each classification's exposure share in the future period to its exposure share in the starting database.

For this purpose, the exposure share in the future period is taken as the exposure share from the two most recent years combined in the filed classification relativities. There are two adjustments made to the two exposure databases before the reweighting factor is calculated. First, a number of classifications are now subject to payroll limitations but were not at the time of the starting database. The exposures from the classification relativities are adjusted to account for this using the same methodology as in the regulatory filings. The other adjustment is to account for definitional changes to the classification system. There may be both classifications in the starting database that are no longer active and classifications from the classification relativities database that did not yet exist at the time of the starting database. These classifications are restated as the classification they were absorbed into or derived from in order to have a common set of classifications in the two exposure databases.

After these adjustments are made, a classification's reweighting factor is calculated as the exposure share from the classification relativities database divided by the exposure share from the starting database. This factor serves as the reweighted claim count for each claim in the claim simulation database. This method implicitly assumes that the claim frequency and size of loss distribution for any classification is unchanged. The assumed changes in the classification mix of exposures will lead to changes in the all-classification frequency and size of loss distribution.

The impact of this adjustment was tested using the simulation database, loss elimination ratios, and classification relativities used in the September 1, 2022 Regulatory Filing. The most recent two policy years are used to calculate the exposure weights. In this filing, policy years 2018 and 2019 were used in the classification relativities. The starting database included policy years 2009, 2010, and 2011. While the classification mix changed significantly between these two time periods, the overall impact on the size of loss distribution was fairly small. This is shown in Exhibit 6.

⁴ For more information, reference item A from the April 22, 2019 Actuarial Research Working Group meeting materials, which was approved at the June 14, 2019 Actuarial Committee meeting.

The loss elimination ratios are used to derive the limit factors used in class ratemaking to adjust losses from a limited value to an unlimited value. These limit factors are used separately for indemnity and medical losses and by hazard group. The relative impact of reweighting can be larger by hazard group since both the aggregate limit factor the hazard group is being compared to and the limit factor for the hazard group itself will change. The limit factors for the original and reweighted simulation databases are shown in Exhibit 7.

Staff recommends applying the adjustment to reweight the simulation database for classification mix. The ARWG was supportive of this recommendation at the November 10, 2022 meeting.

Staff also noted that a data driven update to the simulation database could be made more frequently, with a complete review of the methodologies occurring with roughly the same frequency currently used.

Preliminary Update Results

WCIRB staff has developed updated simulation databases using the current methodologies. During previous updates, only one database was created using an updated starting database along with updated simulation tables. In order to separately examine the impact of the updated starting database and the updated development tables, staff has developed the following databases:

- 1. Database 0: Database underlying the current Plan
 - Uses the old starting database
 - Uses the old simulation tables
 - This version represents the annual update using the current process
- 2. Database 1: Database to examine the impact of the simulation tables
 - Uses the old starting database
 - Uses the updated simulation tables
- 3. Database 2: Database to examine the impact of the starting database
 - Uses the updated starting database
 - Uses the old simulation tables
- 4. Database 3: Database reflecting all data updates
 - Uses the updated starting database
 - Uses the updated simulation tables
 - This version represents the new Plan if updated with no methodological changes

Changes in simulated size of loss distributions are largely tied to the starting database underlying the simulations. Exhibit 8 shows the unadjusted starting database loss elimination ratios prior to development. Exhibit 9 shows the same loss elimination ratios after adjustment to a common cost level.

Loss elimination ratios for the four databases, after adjustment to a common cost level and simulation to ultimate, are shown in Exhibit 10. Comparing database 0 to database 1 shows the impact of the new data on the simulation tables. Comparing database 0 to database 2 shows the impact of the new starting database. Finally comparing database 0 to database 3 shows the overall impact of the new data.



III-B-8 WCIRB California

ы. ening 5th Never Reo @ Ultim Never I Reor G Reopening @ 132 : Rec Closed-C ဗိ IBNR @ 10th 10th ī 3rd 5th Onen @ Open Open Post-@ Ultim : Closed Closed conditional on whether or not the claim is closing. The development factors are limited so that each If a claim was chosen to be "closing" at the RL, it leaves the simulation as closed (possibly to component cannot develop above a maximum or Using the distribution, a separate development factor is simulated for indemnity & medical. The probability of a claim component closing from RL-to-RL is also estimated. The estimates are based on age-to-age data For each claim size & age, a joint medical/ indemnity development factor distribution is from the most recent policy years available. The development factor distributions are below the cumulative paid amount. **USR Sim** estimated. reopen). • • • •

III-B-9 WCIRB California



III-B-10 WCIRB California



III-B-11 WCIRB California



III-B-12 WCIRB California



III-B-13 WCIRB California



III-B-14 WCIRB California
Claim D

.368 243 .208 40, .296 Ratio of 27 40 42 Up to 50 Down 30.6% 24.8% 25.1% 37.2% 28.6% 31.6% 30.0% 29.6% 27.2% 30.1% 31.4% 33.5% 31.1% 31.5% 33.0% 33.0% 32.0% 31.7% 30.4% Down All Maturities Developing Share of Claims: 33.9% 37.4% 33.5% 32.8% 35.4% 38.4% 36.6% 39.2% 41.5% 41.0% 42.3% 40.3% 38.0% 34.1% 42.7% 34.3% 33.5% 35.0% 35.3% a Developing 32.2% 29.9% 28.6% 29.2% 27.4% 28.9% 31.8% 30.6% 33.5% 32.0% 34.0% 36.5% 28.6% 33.3% 27.6% 27.5% 32.3 Not 4 4 1.429 .365 .419 1.380 .303 .326 1.554 1.412 .426 1.610 .192 1.026 1.261 1.387 .561 .376 .18 Ratio of Up to Down 21.1% 19.3% 21.2% 33.3% 24.3% 24.2% 26.8% 22.9% 25.6% 25.6% 25.3% 26.2% 25.2% 29.3% 26.6% 24.7% 24.8% 27.3% 26.9% **Survey Maturities** Down Developing Share of Claims: 33.9% 32.8% 36.7% 34.3% 27.6% 27.3% 28.8% 35.4% 35.8% 39.3% 33.6% 32.1% 32.0% 36.4% 37.0% 36.0% 35.3% 37.5% 30.1% 9 39.0% Developing 39.3% 43.8% 41.2% 41.3% 45.0% 38.0% 40.6% 39.9% 39.8% 46.9% 38.8% 47.9% 36.5% 36.9% 40.9% 35.4% 35.2 Not 1.305 1.256 1.214 1.267 1.258 .102 1.199 .027 0.985 1.414 1.237 .427 322 022 93 Ratio of 47 0.97 Up to .87 Down 26.0% 26.9% 33.6% 38.3% 33.2% 31.8% 30.5% 33.8% 34.4% 35.7% 36.3% 36.3% 34.9% 33.8% 30.0% 32.0% 38.7% 37.5% 31.8% Down **USR Maturities** Developing Share of Claims: 32.6% 33.9% 33.8% 34.5% 45.2% 33.4% 37.7% 38.0% 41.8% 45.4% 45.0% 35.3% 33.0% 38.1% 41.0% 44.7% 42.5% 39.3% 37.1% ŋ 25.2% 24.0% 23.8% 24.9% Developing 22.8% 24.5% 23.1% 25.0% 26.6% 28.5% 27.9% 29.4% 32.5% 30.1% 31.9% 22.7% 21.5% 40.1 39.4 Not 2008 2009 2010 2011 2002 2003 2004 2005 2006 2007 2012 2013 2014 2015 2016 2017 2018 2019 2020 С

III-B-15 WCIRB California

Exhibit 3: Claim Closing Rates

	USR Mat	turities	Survey M	aturities	All Mat	urities
	Remaining	Closing	Remaining	Closing	Remaining	Closing
CY	Open	Rate	Open	Rate	Open	Rate
2002	70.8%	26.6%	80.6%	14.7%	72.8%	24.1%
2003	76.1%	21.6%	80.8%	13.2%	77.3%	19.4%
2004	76.0%	21.3%	80.3%	13.4%	77.1%	19.3%
2005	72.1%	25.9%	81.7%	13.4%	74.5%	22.8%
2006	69.5%	28.4%	74.0%	22.4%	70.6%	27.0%
2007	69.4%	27.5%	80.1%	15.4%	71.8%	24.8%
2008	69.6%	28.3%	79.0%	17.5%	71.9%	25.7%
2009	72.1%	25.9%	79.5%	17.1%	74.1%	23.5%
2010	71.6%	25.9%	80.7%	15.8%	74.4%	22.8%
2011	71.6%	26.1%	79.8%	16.6%	74.7%	22.5%
2012	69.4%	28.0%	80.9%	15.5%	74.5%	22.5%
2013	66.2%	31.6%	78.8%	16.8%	71.9%	24.9%
2014	66.2%	31.5%	79.8%	16.9%	71.8%	25.5%
2015	66.0%	31.9%	81.3%	15.6%	72.2%	25.2%
2016	64.1%	33.7%	79.0%	18.7%	70.2%	27.6%
2017	63.2%	34.6%	78.3%	19.1%	69.5%	28.1%
2018	60.1%	37.8%	77.8%	20.3%	68.5%	29.5%
2019	60.3%	37.5%	72.5%	25.5%	65.7%	32.2%
2020	63.9%	33.9%	69.3%	29.2%	65.8%	32.2%

	Excluding	CY 2020	0.978	0.961	0.936	0.914	0.896	0.879	0.812	0.757	0.710	0.669	0.598	0.515	0.416	0.349	0.265	0.219	0.190	0.171	0.146	0.130	0.119	0.111	0.104	0.098	0.093	0.064	0.049	0.039	0.032	0.027	0.023	0.019	0.016	0.014
	Excluding	CY 2019	0.978	0.961	0.936	0.914	0.896	0.879	0.811	0.757	0.710	0.668	0.598	0.514	0.415	0.348	0.264	0.218	0.189	0.169	0.145	0.129	0.118	0.109	0.102	0.096	0.091	0.062	0.047	0.037	0.030	0.025	0.021	0.018	0.015	0.013
	Excluding	CY 2018	0.978	0.961	0.936	0.914	0.896	0.879	0.811	0.757	0.710	0.668	0.598	0.515	0.415	0.348	0.265	0.218	0.189	0.170	0.145	0.129	0.118	0.109	0.102	0.097	0.092	0.062	0.047	0.037	0.030	0.025	0.021	0.018	0.015	0.013
	Excluding 1	CY 2017	0.978	0.961	0.936	0.914	0.896	0.879	0.811	0.756	0.709	0.668	0.597	0.514	0.415	0.347	0.264	0.217	0.188	0.169	0.144	0.129	0.118	0.109	0.102	0.096	0.091	0.062	0.047	0.037	0.031	0.026	0.022	0.018	0.016	0.014
	Excluding 1	CY 2016	0.978	0.961	0.936	0.914	0.896	0.879	0.811	0.757	0.710	0.668	0.598	0.514	0.415	0.348	0.265	0.218	0.189	0.170	0.145	0.130	0.119	0.110	0.103	0.097	0.092	0.062	0.047	0.037	0.030	0.025	0.021	0.017	0.015	0.012
	Excluding E	CY 2015	0.978	0.961	0.935	0.914	0.895	0.878	0.811	0.756	0.708	0.666	0.596	0.512	0.412	0.344	0.261	0.214	0.185	0.166	0.141	0.126	0.115	0.106	0.099	0.093	0.089	0.060	0.045	0.035	0.029	0.024	0.020	0.017	0.014	0.012
	Excluding E	CY 2014 (0.978	0.961	0.936	0.915	0.896	0.879	0.811	0.757	0.709	0.667	0.597	0.513	0.414	0.346	0.263	0.216	0.187	0.168	0.143	0.128	0.117	0.108	0.101	0.096	0.091	0.062	0.046	0.037	0.030	0.025	0.021	0.017	0.015	0.012
	excluding E	CY 2013 (0.978	0.961	0.935	0.914	0.895	0.878	0.811	0.756	0.708	0.666	0.595	0.511	0.412	0.343	0.260	0.213	0.184	0.165	0.140	0.124	0.113	0.105	0.098	0.092	0.087	0.058	0.043	0.034	0.027	0.023	0.019	0.016	0.013	0.011
atios	xcluding E	X 2012 0	0.977	0.961	0.935	0.914	0.895	0.878	0.810	0.755	0.708	0.666	0.594	0.510	0.410	0.342	0.258	0.212	0.183	0.164	0.139	0.123	0.112	0.104	0.097	0.091	0.086	0.058	0.044	0.035	0.028	0.023	0.020	0.017	0.014	0.012
mination Ra	xcluding E	Y 2011 C	0.977	0.961	0.935	0.914	0.895	0.878	0.810	0.755	0.708	0.666	0.595	0.511	0.411	0.342	0.259	0.212	0.183	0.164	0.139	0.124	0.113	0.104	0.098	0.092	0.087	0.058	0.044	0.035	0.028	0.023	0.019	0.016	0.013	0.011
ed Loss Eli	xcluding E	Y 2010 C	0.977	0.961	0.935	0.914	0.895	0.878	0.810	0.754	0.707	0.664	0.593	0.509	0.408	0.340	0.256	0.209	0.180	0.160	0.136	0.120	0.109	0.101	0.094	0.089	0.084	0.056	0.042	0.033	0.026	0.021	0.018	0.015	0.012	0.010
Unadjust	cluding E	2009 C	0.978	0.961	0.936	0.915	0.896	0.879	0.812	0.757	0.709	0.667	0.596	0.512	0.413	0.344	0.261	0.214	0.185	0.165	0.140	0.125	0.114	0.105	0.098	0.092	0.087	0.058	0.044	0.034	0.028	0.023	0.019	0.016	0.014	0.011
	cluding Ex	2008 C	0.978	0.961	0.936	0.915	0.896	0.880	0.812	0.757	0.710	0.668	0.597	0.513	0.413	0.345	0.261	0.214	0.185	0.165	0.140	0.125	0.114	0.105	0.098	0.092	0.088	0.059	0.044	0.035	0.029	0.023	0.020	0.016	0.014	0.012
	studing Ex-	2007 CN	0.977	0.961	0.935	0.914	0.895	0.879	0.811	0.756	0.708	0.666	0.595	0.511	0.412	0.343	0.260	0.213	0.184	0.164	0.139	0.124	0.113	0.104	0.097	0.091	0.086	0.057	0.042	0.033	0.026	0.021	0.018	0.015	0.012	0.010
	sluding Exe	2006 CY	0.978	0.961	0.936	0.914	0.896	0.879	0.811	0.756	0.709	0.667	0.596	0.513	0.413	0.345	0.262	0.215	0.186	0.166	0.141	0.125	0.114	0.106	0.099	0.093	0.088	0.059	0.044	0.035	0.028	0.023	0.019	0.016	0.014	0.011
	luding Exc	2005 CY	0.978	0.961	0.935	0.914	0.895	0.878	0.811	0.756	0.708	0.666	0.595	0.511	0.411	0.343	0.259	0.212	0.183	0.164	0.139	0.124	0.113	0.104	0.097	0.092	0.087	0.058	0.043	0.034	0.027	0.022	0.019	0.016	0.013	0.011
	luding Exc	2004 CY	0.977	0.961	0.935	0.914	0.895	0.878	0.810	0.755	0.707	0.665	0.594	0.510	0.409	0.341	0.257	0.210	0.181	0.162	0.137	0.122	0.111	0.103	0.096	0.091	0.086	0.058	0.043	0.034	0.028	0.023	0.019	0.016	0.014	0.012
	luding Exc	2003 CY	0.977	0.961	0.935	0.914	0.895	0.878	0.810	0.754	0.706	0.664	0.593	0.509	0.408	0.340	0.256	0.209	0.180	0.161	0.136	0.121	0.110	0.102	0.095	0.089	0.084	0.056	0.042	0.033	0.027	0.022	0.018	0.015	0.013	0.011
	luding Exc	2002 CY	0.977	0.961	0.935	0.914	0.895	0.878	0.810	0.755	0.707	0.665	0.593	0.509	0.409	0.340	0.256	0.209	0.181	0.161	0.136	0.121	0.110	0.102	0.095	0.089	0.084	0.056	0.042	0.033	0.026	0.021	0.018	0.015	0.013	0.011
	uding Exc	2001 CY	0.977	0.961	0.935	0.914	0.895	0.878	0.810	0.755	0.708	0.666	0.595	0.511	0.411	0.342	0.259	0.212	0.183	0.163	0.139	0.123	0.112	0.104	0.097	0.091	0.086	0.058	0.043	0.034	0.028	0.023	0.019	0.016	0.014	0.012
	s Excl	nit CY	500	1,000	2,000	3,000	1,000	5,000	0000	5,000	0000'(5,000	5,000	000'(5,000	0000	000'(000'(0000	000'(000'(0000	000'(000'(000'(000'(0000	0000	000'(000'(0000	0000	000'(000'(000'0	000,0
	ŝ	ε	1	·	~ ~	c)	7	ŝ	1	1	2	5	35	5	25	S	5	З	50	З	З	S	З	З	З	S	ğ	ğ	ğ	ğ	ğ	ğ	ğ	ğ	ğ	ğ

Exhibit 4: Sensitivity Testing	Simulated Loss Elimination Ratios Excluding Individual Years from Development Tables
--------------------------------	--------------------------------------------------------------------------------------

Actuarial Committee Meeting Agenda for December 8, 2020

_	Unadjusted	Loss Elimination	Ratios	Change from A	All-Yr Avg.
Loss	All Year	Most Recent	5 Years	Most Recent	5 Years
Limit	Average	Dbl. Wt.	Only	Dbl. Wt.	Only
500	0.978	0.977	0.976	-0.04%	-0.11%
1,000	0.961	0.961	0.959	-0.05%	-0.14%
2,000	0.935	0.935	0.934	-0.06%	-0.13%
3,000	0.914	0.914	0.913	-0.06%	-0.10%
4,000	0.895	0.895	0.894	-0.06%	-0.08%
5,000	0.878	0.878	0.877	-0.07%	-0.09%
10,000	0.811	0.809	0.806	-0.22%	-0.42%
15,000	0.756	0.753	0.747	-0.38%	-0.84%
20,000	0.708	0.705	0.696	-0.54%	-1.26%
25,000	0.667	0.662	0.651	-0.69%	-1.68%
35,000	0.596	0.590	0.575	-1.01%	-2.55%
50,000	0.512	0.504	0.485	-1.47%	-3.86%
75,000	0.412	0.403	0.379	-2.24%	-6.07%
100,000	0.344	0.334	0.306	-2.99%	-8.25%
150,000	0.260	0.249	0.219	-4.37%	-12.17%
200,000	0.214	0.202	0.171	-5.53%	-15.33%
250,000	0.185	0.173	0.142	-6.45%	-17.74%
300,000	0.165	0.154	0.124	-7.17%	-19.49%
400,000	0.141	0.129	0.101	-8.20%	-21.71%
500,000	0.125	0.114	0.088	-8.93%	-23.09%
600,000	0.114	0.103	0.078	-9.52%	-24.03%
700,000	0.106	0.095	0.072	-9.96%	-24.76%
800,000	0.099	0.088	0.066	-10.33%	-25.35%
900,000	0.093	0.083	0.062	-10.66%	-25.82%
1,000,000	0.088	0.078	0.058	-10.97%	-26.20%
2,000,000	0.059	0.052	0.037	-12.79%	-28.84%
3,000,000	0.044	0.038	0.026	-13.96%	-31.77%
4,000,000	0.035	0.030	0.020	-14.95%	-34.33%
5,000,000	0.028	0.024	0.015	-15.70%	-37.30%
6,000,000	0.023	0.020	0.012	-16.15%	-39.67%
7,000,000	0.020	0.016	0.010	-16.39%	-41.65%
8,000,000	0.016	0.014	0.008	-16.34%	-43.96%
9,000,000	0.014	0.012	0.006	-16.38%	-46.36%
10,000,000	0.012	0.010	0.005	-16.51%	-48.92%

Exhibit 5: Sensitivity Testing Simulated Loss Elimination Ratios Giving More Weight to More Recent Years

Accident	Sept	ember	1, 202 lifornio	2 Regu	latory I	Filing			Accident F	Reweigl	hted Se	ptembe	r 1, 202;	2 Regula	atory Fi	ling		
Limit	~	29.	3	4 4	a Giou	9 0	7	Total	Limit	~	0	3	a nazai 4	n ci cu l	9 0	7	Total	Total
25,000 0.	622 0.	636 0).667	0.703	0.730	0.761	0.806	0.673	25,000	0.622	0.638	0.667	0.699	0.740	0.764	0.806	0.675	0.26%
35,000 0.	536 0.	553 0).588	0.630	0.662	0.699	0.753	0.596	35,000	0.536	0.555	0.588	0.626	0.674	0.702	0.753	0.598	0.45%
50,000 0.	437 0.	458 0	.495	0.543	0.582	0.622	0.688	0.505	50,000	0.439	0.461	0.496	0.540	0.595	0.624	0.687	0.509	0.72%
75,000 0.	330 0.	354 0	0.390	0.441	0.486	0.526	0.604	0.403	75,000	0.333	0.357	0.391	0.440	0.500	0.528	0.603	0.407	1.07%
100,000 0.	266 0.	290 0	0.325	0.374	0.422	0.458	0.543	0.338	100,000	0.269	0.293	0.325	0.374	0.436	0.460	0.543	0.342	1.27%
150,000 0.	199 0.	221 0	0.251	0.295	0.343	0.373	0.465	0.264	150,000	0.202	0.223	0.252	0.296	0.357	0.377	0.464	0.268	1.52%
200,000 0.	165 0.	185 0	0.212	0.252	0.297	0.325	0.417	0.225	200,000	0.168	0.186	0.213	0.253	0.312	0.331	0.416	0.229	1.77%
250,000 0.	144 0.	162 0		0.223	0.267	0.293	0.383	0.199	250,000	0.148	0.163	0.188	0.226	0.283	0.301	0.383	0.203	2.00%
300,000 0.	130 0.	146 0		0.204	0.246	0.270	0.358	0.181	300,000	0.134	0.147	0.171	0.206	0.262	0.279	0.358	0.185	2.21%
400,000 0.	112 0.	125 0	0.147	0.176	0.216	0.238	0.322	0.157	400,000	0.115	0.126	0.148	0.179	0.233	0.248	0.321	0.161	2.51%
500,000 0.	100 0.	111 0	1 .131	0.158	0.195	0.216	0.295	0.141	500,000	0.103	0.111	0.132	0.161	0.212	0.226	0.295	0.144	2.76%
600,000 0.	091 0.	101 0	1.119	0.144	0.179	0.199	0.274	0.128	600,000	0.094	0.101	0.120	0.147	0.196	0.209	0.274	0.132	2.97%
700,000 0.	084 0.	092	0.109	0.133	0.167	0.186	0.257	0.118	700,000	0.087	0.093	0.111	0.136	0.184	0.195	0.257	0.122	3.16%
800,000 0.	078 0.	086 0		0.124	0.156	0.174	0.243	0.110	800,000	0.081	0.086	0.103	0.127	0.173	0.184	0.243	0.114	3.32%
900,000 0.	073 0.	080 0		0.116	0.147	0.164	0.231	0.104	900,000	0.076	0.081	0.096	0.119	0.164	0.173	0.231	0.107	3.47%
1,000,000 0.	069 0.	076 0	0.0900.058	0.109	0.139	0.155	0.220	0.098	1,000,000	0.071	0.076	0.091	0.112	0.155	0.164	0.220	0.101	3.59%
2,000,000 0.	045 0.	048 0		0.071	0.091	0.102	0.150	0.063	2,000,000	0.046	0.049	0.059	0.073	0.104	0.109	0.150	0.066	4.27%
3,000,000 0.	032 0.	035 0		0.051	0.066	0.074	0.109	0.046	3,000,000	0.034	0.035	0.043	0.053	0.075	0.079	0.109	0.048	4.57%
4,000,000 0.	024 0.	026 0	0.031	0.038	0.049	0.055	0.081	0.034	4,000,000	0.025	0.026	0.032	0.040	0.056	0.059	0.081	0.036	4.67%
5,000,000 0.	018 0.	020 0	0.024	0.029	0.037	0.042	0.062	0.026	5,000,000	0.019	0.020	0.024	0.030	0.043	0.045	0.062	0.027	4.66%
6,000,000 0.	014 0.	015 0	0.018	0.022	0.029	0.032	0.048	0.020	6,000,000	0.015	0.015	0.019	0.023	0.033	0.035	0.048	0.021	4.55%
7,000,000 0.	011 0.	012 0	0.014	0.017	0.023	0.025	0.037	0.016	7,000,000	0.011	0.012	0.015	0.018	0.026	0.027	0.037	0.016	4.37%
8,000,000 0.	009 0.	009 0	0.011	0.014	0.018	0.020	0.029	0.012	8,000,000	0.009	0.010	0.011	0.014	0.020	0.021	0.029	0.013	4.14%
9,000,000 0.	007 0.	008 0	0.009	0.011	0.014	0.016	0.023	0.010	9,000,000	0.007	0.008	0.009	0.011	0.016	0.017	0.023	0.010	3.85%
10,000,000 0.	006 0.	006 0	0.003	0.009	0.011	0.013	0.019	0.008	10,000,000	0.006	0.006	0.007	0.009	0.013	0.014	0.019	0.008	3.53%
15,000,000 0.	002 0.	002 0		0.003	0.004	0.005	0.007	0.003	15,000,000	0.002	0.002	0.003	0.003	0.005	0.005	0.007	0.003	1.51%
20,000,000 0.	001 0.	001 0		0.001	0.002	0.002	0.003	0.001	20,000,000	0.001	0.001	0.001	0.001	0.002	0.002	0.003	0.001	-0.88%

Exhibit 6: Simulation Database Reweighting

s Ratemaking
Class
<u>е</u>
Used
Factors
Limit
eighting on
of Rew
Impact c
Exhibit 7:

Limit Factors to Account for Claims in Excess	of the Loss Limit Threshold (\$500,000)
-----------------------------------------------	-----------------------------------------

Reweighted Limit Factors to Account for Claims in

Excess of the Loss Limit Threshold (\$500,000)

;	Retrospective	- 0000
	ying	•
	der	
:	s Un	(
, I	Factor	ī
:	l	;
	Ĩ	(

<u>Rating Pl</u>	an at September 1, 2022	<u>2 Level</u>		Rating P	lan at September 1, 2022	Level
idemnity	<u>Medical</u>	Total *	RHG	Indemnity	<u>Medical</u>	Total *
1.058	1.150	1.111	~	1.062	1.155	1.115
1.066	1.168	1.125	2	1.066	1.169	1.125
1.078	1.209	1.150	ი	1.079	1.211	1.152
1.096	1.266	1.187	4	1.098	1.271	1.191
1.120	1.350	1.242	5	1.131	1.394	1.269
1.131	1.414	1.276	9	1.138	1.436	1.292
1.199	1.626	1.418	7	1.197	1.627	1.418
1.084	1.226	1.163	Aggregate	1.087	1.234	1.169
<u>x</u>	Limit Factor elativities to Aggregate			E.	Limit Factor Relativities to Aggregate	
Indemnity	Medical	Total *	RHG	Indemnity	Medical	Total *
0.975	0.938	0.955	-	0.976	0.936	0.954
0.983	0.952	0.967	2	0.981	0.947	0.963
0.994	0.986	0.989	က	0.992	0.981	0.985
1.010	1.033	1.020	4	1.010	1.030	1.019
1.032	1.101	1.068	5	1.040	1.130	1.086
1.043	1.153	1.097	9	1.046	1.164	1.105
1.106	1.326	1.219	7	1.101	1.318	1.213

* For reference only.

* For reference only.

Limit Factors Underlying Retrospective

III-B-20 WCIRB California



Actuarial Committee Meeting Agenda for December 8, 2020

III-B-21 WCIRB California



III-B-22 WCIRB California

		Database 0	Database 1	Database 2	Database 3
per Claim	Starting Database	Old	Old	New	New
Limit	Simulation Tables	Old	New	Old	New
0		1.000	1.000	1.000	1.000
500		0.980	0.979	0.979	0.978
1,000		0.967	0.965	0.965	0.963
2,000		0.947	0.942	0.942	0.938
3,000		0.928	0.921	0.923	0.917
4,000		0.910	0.902	0.904	0.897
5,000		0.893	0.885	0.888	0.879
10,000		0.824	0.811	0.818	0.807
15,000		0.764	0.748	0.760	0.747
20,000		0.711	0.692	0.709	0.694
25,000		0.662	0.641	0.663	0.647
35,000		0.579	0.554	0.585	0.567
50,000		0.484	0.454	0.493	0.473
75,000		0.377	0.343	0.387	0.365
100,000		0.311	0.275	0.319	0.296
150,000		0.239	0.202	0.239	0.215
200,000		0.200	0.164	0.197	0.173
250,000		0.176	0.140	0.170	0.147
300,000		0.158	0.124	0.152	0.130
400,000		0.135	0.102	0.128	0.107
500,000		0.119	0.088	0.113	0.093
600,000		0.107	0.078	0.102	0.083
700,000		0.097	0.070	0.093	0.075
800,000		0.089	0.064	0.085	0.069
900,000		0.083	0.059	0.079	0.063
1,000,000		0.077	0.054	0.074	0.059
2,000,000		0.044	0.030	0.042	0.033
3,000,000		0.028	0.018	0.027	0.020
4,000,000		0.018	0.011	0.017	0.013
5,000,000		0.011	0.007	0.011	0.008
6,000,000		0.007	0.004	0.007	0.005
7,000,000		0.004	0.002	0.004	0.003
8,000,000		0.002	0.001	0.002	0.001
9,000,000		0.001	0.000	0.001	0.001
10,000,000		0.000	0.000	0.000	0.000

Exhibit 10.1: Adjusted and Developed Loss Elimination Ratios



III-B-24 WCIRB California



Exhibit 10.3

III-B-25 WCIRB California



III-B-26 WCIRB California



III-B-27 WCIRB California

Item AC22-12-07 Updates to the Medical Characteristics of COVID-19 Claims and Long COVID Study

In March 2022, the WCIRB published a study on the <u>medical treatments and costs of COVID-19 claims</u> and an early look at long COVID in the California workers' compensation system. Based on updated data, staff has updated the study with a focus on the medical characteristics of COVID-19 claims in 2020 compared to those in 2021 as well as the prevalence of long COVID during the 12-month post-acute care period.

At the meeting, staff will present the preliminary findings of the updated analysis. Attached are slides summarizing staff's preliminary findings.

Research Questions

- 1. How do medical characteristics of COVID-19 claims in 2020 compare to those of COVID-19 claims in 2021?
 - COVID-19 claim distribution by levels of medical care needed (mild, severe, critical and death)
 - Medical treatment and cost patterns for mild and hospital claims
 - Early results on:
 - Claims without any medical treatment
 - Hospital claims with permanent disability
 - Development of indemnity-only claims
 - Litigation
 - Claims reopening
- 2. What is the prevalence of long COVID during the 12-months post-acute care period?
 - Difference between AY2020 and AY2021 claims
 - Clusters of long COVID symptoms for mild and hospital claims
- 3. What are the characteristics of long COVID Claims?
 - Demographics
 - Post-acute treatments and costs for mild and hospital claims
 - Permanent disability



Research Approach

- Data source:
 - WCIRB medical transaction data
 - WCIRB Unit Statistical Report data (USR)
 - WCIRB indemnity transaction data (TI)
- Claim Population
 - A sample of COVID-19 claims from insured employers:
 - With any medical payments, including medical-only and indemnity/medical claims
 - Identified using Catastrophe Number 12 in USR or Nature of Injury/Cause of Injury 83 in USR or TI
 - Mild claims: with no hospital care
 - Severe claims: with hospital care but without ICU care
 - Critical claims: with ICU care
 - Death claims: based on injury type in the USR data or death field in the TI data
 - Non-COVID-19 claims with any medical payments and same criteria for mild, severe, critical and death claims
- Accident date period:
 - April 2020 through December 2021



Distribution of COVID-19 Claims by Levels of Medical Care Needed

As of October 7, 2022

Levels of Medical Care Needed	Share of COVID-1 Medical Pa (N = 9,2	9 Claims with yments 257)	Share of Non-COVID-19 Claims with Medical Payments (N = 479,554)
	AY2020	AY2021	AY2020-2021
Mild (no hospital care)	91.2%	91.3%	98.7%
Severe (no ICU, excl. deaths)	3.3%	4.3%	0.9%
Critical (w/ ICU, excl. deaths)	3.3%	2.7%	0.3%
Death*	2.1%	1.7%	0.1%
Total	100%	100%	100%



III-C-4

Note. Death claims in the WC system were identified using the death field in the TI data and injury type in the USR data. Source: WCIRB medical transaction data, WCIRB indemnity transaction data and WCIRB unit statistical report data.

Average Paid Medical Severity of COVID-19 Claims by Levels of Medical Care Needed and by Accident Year

As of October 7, 2022





Distribution of Total Paid Medical at 1st Report Level by Levels of Medical Care Needed (AY2020 and AY2021)

As of October 7, 2022

Objective. Trusted. Integral



Source: WCIRB Unit Statistical Report data at 1st RL and medical transaction data

Leading Types of Medical Services in the First 30 Days for Mild COVID-**19 Claims by Accident Year**

As of October 7, 2022

Objective. Trusted. Integral



Note. First 30-day medical services were medical services provided within 30 days from the first medical treatment. Source: WCIRB medical transaction data

Service Utilization during the First 30 Days after Initial Medical Treatment for Mild COVID-19 Claims (AY2020 vs. AY2021)

As of October 7, 2022

Number of Services per 100 Mild COVID-19 Claims during 1st Month

AY2020 AY2021



Leading Types of Medical Services



Service Utilization during Five Months Subsequent to the First 30 Days for Mild Claims (AY2020 vs. AY2021)

As of October 7, 2022

Number of Services per 100 Mild COVID-19 Claims between 2nd Month and 6th Month



III-C-9

AY2020 AY2021



Average Payments for Hospitalization (AY2020 vs. AY2021)

As of October 7, 2022

Objective. Trusted. Integral.



Note. Inpatient care includes medical transactions with a DRG code as well as any room and board outpatient procedure code. Source: WCIRB medical transaction data.

Average Length of Hospital Stay for COVID-19 Hospital Claims (AY2020 vs. AY2021)

As of October 7, 2022



III-C-11



Leading Five Diagnostic-Related Groups (DRG) for COVID-19 Hospital Claims (AY2020 vs. AY2021)

As of October 7, 2022





Source: WCIRB medical transaction data.

Hospital Claims involving Disability at RL1 – Early results

As of October 7, 2022

Objective. Trusted. Integral.



Average Medical Severity of Hospital Claims with Permanent Disability at RL1



III-C-14



COVID-19 Claims Without Payments for Medical Treatment – Early Results (Accident date: April 2020 – January 2022)

As of October 7, 2022





Source: WCIRB medical transaction data.

Leading Services on COVID-19 Claims Without Medical Treatment – Early Results (Accident date: April 2020 – January 2022)

As of October 7, 2022





III-C-16

Ratio of Paid ALAE to Total Incurred Loss at RL1 – Early Results

As of October 7, 2022





Note: Indemnity-only claims are excluded.

Source: WCIRB medical transaction data and WCIRB Unit Statistical Report data.

Development of Indemnity-Only COVID-19 Claims from RL1 to RL2 – Early results

As of October 7, 2022



% of indemnity-only claims at RL1 that transitioned to indemnity/medical claims at RL2

% of transitioned indemnity-only claims that involved hospital care after RL1



Rate of COVID-19 Claims Reopening – Early results

As of October 7, 2022

	% of Closed COVID-19 Claims at RL1
COVID-19 Claims reopened at RL2	0.5%

- Small sample size (25 claims)
 Reopened claims had significantly higher average incurred medical at RL2 than
 - RL1
- Most medical-only claims at RL1 shifted to PD at RL2
- 30% of those with medical treatments had long COVID



III-C-19

Long COVID Analysis Approach

As of October 7, 2022

- Followed the definition of "long COVID" from NIH
- Used ICD information to identify COVID-19 claims with medical treatment for long COVID symptoms ("Long COVID Claims")
 - ICD information for long COVID symptoms* was updated to reflect the latest research from CDC and other peerreview journals
- Extended the analysis timeframe for long COVID to 1-year post-acute care period based on available data
 - Post-acute care period starts on 31st day from the first medical treatment for mild claims and starts on 31st day from hospital discharge for both severe and critical claims
 - Analyzed medical treatment patterns during the post-acute care period for long COVID claims
- Analyzed leading long COVID symptoms in multiple body systems
 - General symptoms (chronic fatigue syndrome, etc.)
 - Respiratory, Musculoskeletal, Circulatory (mostly clotting issues), Cardiac, Mental/psychiatric, Neurological and Renal
- Analyzed the extent of disability associated with long COVID



III-C-20

Prevalence of Long COVID Varies by Initial Level of Medical Care

As of October 7, 2022

Prevalence of Long COVID During the 12-Month Post-Acute Care Period* (April 2020 - March 2021 Accident Dates)



Source: WCIRB medical transaction data.

Prevalence of Long COVID by Accident Year for Mild and Hospital Claims

As of October 7, 2022

Prevalence of Long COVID During the 12-Month Post-Acute Care Period (April 2020 - March 2021 Accident Dates)

AY2020 AY2021





Source: WCIRB medical transaction data.

Trend of Long COVID Prevalence

As of October 7, 2022






Leading Types of Long COVID Symptoms

As of October 7, 2022

COVID-19 Mild Claims

COVID-19 Hospital Claims



III-C-24



Note. * Long COVID Included medical treatment transactions with ICD code of U09.9 (Long COVID, effective Oct 1, 2021). U07.1 (COVID-19) and B94.8 (Sequelae of other specified infectious and parasitic diseases). Source: WCIRB medical transaction data.

Distribution of Long COVID Claims by Number of Long COVID Symptoms

As of October 7, 2022

Objective. Trusted. Integral.

Distribution of Number of Long COVID Symptoms

One symptom Multiple symptoms



Source: WCIRB medical transaction data.

Prevalence of Long COVID by Age Group

As of October 7, 2022







Source: WCIRB medical transaction data.

Prevalence of Long COVID by Leading Industries







Leading Types of Medical Services during One-Year Post-Acute Care Period for Mild COVID-19 Claims





Leading Types of Medical Services during One-Year Post-Acute Care Period for COVID-19 Hospital Claims





Distribution of Long COVID Claims by Injury Type

As of October 7, 2022



California™ Objective. Trusted. Integral.

III-C-30

Average Incurred Medical for Long COVID by Injury Type





Permanent Disability Rating for Long COVID PD Claims





Source: WCIRB medical transaction data and WCIRB Unit Statistical Report data

Summary of Preliminary Findings

- Medical Characteristics of COVID-19 Claims (AY2020 vs. AY2021)
 - Higher share of severe claims and lower share of critical and death claims in 2021
 - Comparable six-month overall average medical payments
 - Slightly different treatment patterns for mild claims during the acute care period in 2021
 - Higher average hospitalization costs for critical and lower for severe claims of AY2021
 - Driven by length of stay and ventilator support
- Prevalence of long COVID
 - 1 in 8 (13%) COVID-19 claims with medical payments during the 12-month post acute care period
 - Leading long COVID symptoms: respiratory, chronic fatigue
- Characteristics of long COVID claims
 - Higher risks for older age groups and health care workers
 - Tend to continue with medical treatments vs. other COVID-19 claims have more medical-legal / interpreter / copy service
 - A higher share with PD: higher average PD rating and higher average medical incurred than other COVID-19 claims



Potential Next Steps

- Estimate the prevalence of long COVID in the group health dataset of a sample of California workers with group health insurance and compare it with the estimates in WC
- Analyze how comorbidity affects initial COVID-19 infection severity and risks of long COVID in the group health data
- Potential collaboration with the CA Department of Public Health on long COVID research
- Publish the updated analysis in first quarter of 2023
- Update the long COVID analysis in November 2023



Item AC-22-12-08 Telehealth Study

Use of telehealth services in the California workers' compensation system increased substantially during the pandemic period, mostly driven by the growing demand for telehealth services as a result of the stayat-home orders in 2020 and surges of COVID-19 infections. An expanded list of telehealth procedures was established by the Centers for Medicare and Medicaid Services and adopted by the Division of Workers' Compensation in 2020 allowing telehealth procedures to be reimbursed at the same rate as inperson services. In 2021, the Medical Analytics Working Group (Working Group) suggested that the WCIRB conduct a study to understand the trends and patterns of telehealth services in the workers' compensation system.

Based on the Working Group's suggestion, the WCIRB has conducted a study on telehealth services to understand the characteristics of telehealth services provided in the California workers' compensation system and how claims involving telehealth services compare to claims involving only in-person medical services. Staff will present the preliminary analysis findings at the meeting.