

2018 WCIRB Geo Study

A Report on California Regional Differences

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Table of Contents

About the WCIRB	3
Executive Summary	4
What's New	5
Basis of Analysis	6
Exhibit 1: Geographic Regions	8
Exhibit 2: Indemnity Claim Frequency Relative to Statewide	9
Exhibit 3: PY 2015 to 2016 Change in Indemnity Claim Frequency Relativity	10
Exhibit 4: Limited Incurred Severity on Indemnity Claims Relative to Statewide	11
Exhibit 5: Median Injured Worker's Average Weekly Wage	12
Exhibit 6: Permanent Disability Claims as a Share of Indemnity Claims	13
Exhibit 7: Cumulative Trauma Claims as a Share of Total Claims	14
Exhibit 8: Share of Indemnity Claims with a Medical Legal Report	15
Exhibit 9: PY 2015 to 2016 Percent Point Change in Pharmaceutical Share	16
Exhibit 10: Ratio of Limited Losses to Modified Pure Premium	17
Exhibit 11: Median Paid ALAE on Permanent Disability Claims	18
Exhibit 12: Open Share of Indemnity Claims	19
Technical Appendix	20
More Info	24
Disclaimer and Copyright	28

About the WCIRB

For over 100 years, the WCIRB has been California's trusted, objective provider of actuarially-based information and research integral to a healthy California workers' compensation system.

As a licensed rating organization and California Insurance Commissioner's designated statistical agent, the WCIRB performs a number of functions including collection of premium and loss data on every workers' compensation insurance policy, examination of policy documents, inspection of insured businesses, and test audits of insurer payroll audits and claims classifications. This data is used to advise the Insurance Commissioner and other stakeholders of the costs of providing workers' compensation benefits.

The WCIRB is a California unincorporated, private, nonprofit association comprised of all insurers licensed to transact workers' compensation insurance in California, and has over 400 members. No state money is used to finance its operations.



For more information, please visit [wcirb.com](https://www.wcirb.com).

Let us know what you think by emailing us at ActuarialResearch@wcirb.com



Executive Summary

The California workers' compensation system is established, administered and interpreted on a statewide basis. Nevertheless, there are sharp differences in cost characteristics across regions of the state. This report highlights those differences.

Key findings include:

- Even after controlling for regional differences in wages and industrial mix, indemnity claim frequency is significantly higher in the Los Angeles Basin and significantly lower in the San Francisco Bay Area.
- Differences in regional indemnity claim frequency range from more than 32% higher than average in the Los Angeles/Long Beach region to almost 25% lower than average in the San Francisco Peninsula/Silicon Valley region. The difference between these regions grew from 2015 to 2016.
- Pharmaceutical costs throughout the state have dropped over the last several years with the largest reductions occurring in Southern California.
- Both medical legal costs and paid allocated loss adjustment expenses are significantly higher in the Bakersfield and Los Angeles Basin regions than in the remainder of the state.
- The median paid ALAE on permanent disability claims increased more than 9% from 2015 to 2016. The average increased more than 7%.

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

[Appendix](#)

[More Info](#)

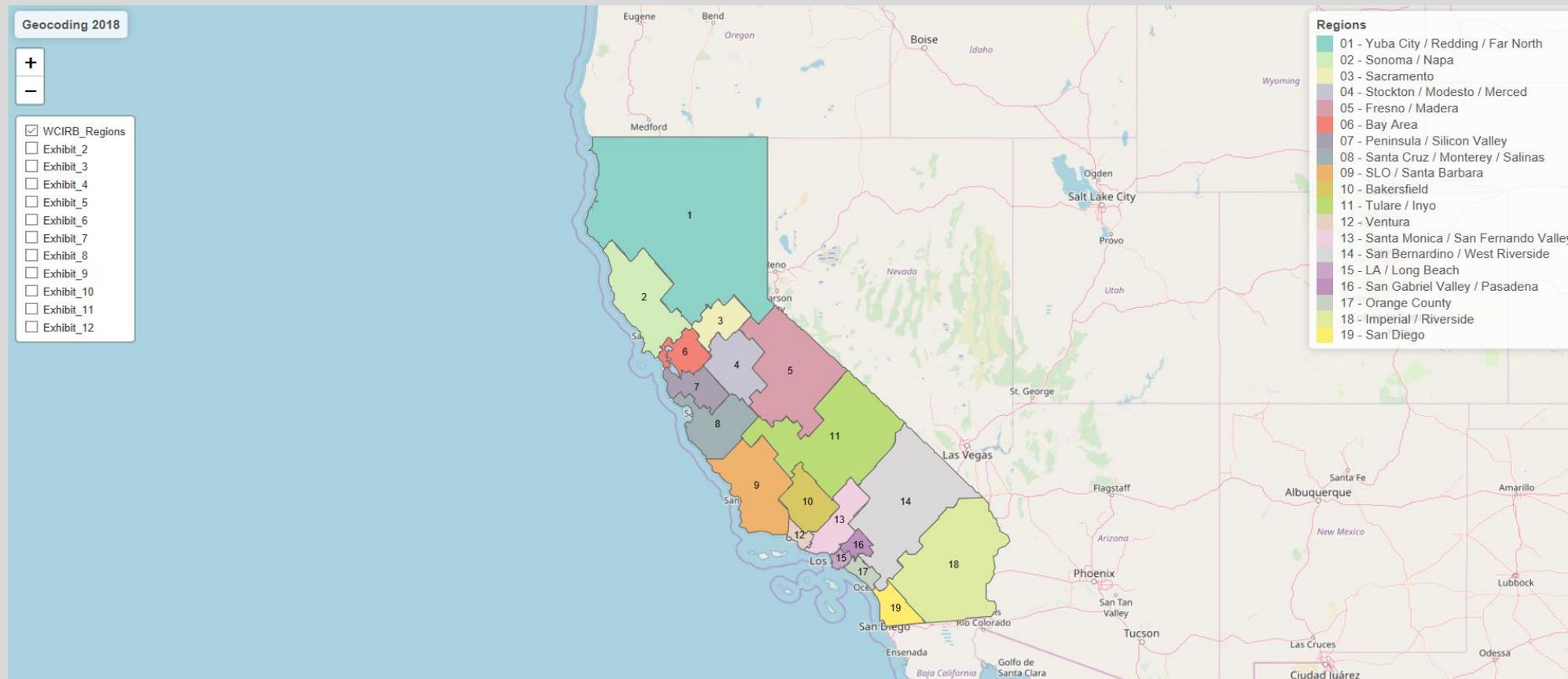
[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

What's New

Interactive versions of the geographic maps are now available in html format.



A mapping of nine-digit zip codes and regional wage differentials to the study regions shown in **Exhibit 1** are available in the **Research and Analysis** section of the WCIRB website. More information about the development of the maps and the data underlying the maps is included in the **Technical Appendix** to this report.

- [Exhibit 1](#)
- [Exhibit 2](#)
- [Exhibit 3](#)
- [Exhibit 4](#)
- [Exhibit 5](#)
- [Exhibit 6](#)
- [Exhibit 7](#)
- [Exhibit 8](#)
- [Exhibit 9](#)
- [Exhibit 10](#)
- [Exhibit 11](#)
- [Exhibit 12](#)
- [Appendix](#)
- [More Info](#)
- [Geo Data Table](#)
- [Interactive Map](#)
- [Geo Zip Region](#)

Basis of Analysis

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

[Appendix](#)

[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

WCIRB staff have developed a dataset that allows estimates of the incidence of exposures and claims by classification and region. The dataset was developed by linking the WCIRB's unit statistical and medical transactional datasets with external data that complements the WCIRB's unit statistical data by providing refined geographical information.

External data was used to control for regional wage differentials, industrial mix and the number of workers at each location. WCIRB staff developed geographic regions that reflect high degrees of medical provider commonality while at the same time being robust, credible and independent of the claim cost measures under study. The **Technical Appendix** describes the methodologies used in the study in greater detail.

This enriched dataset comprises three policy years of data. For this study, the WCIRB used the experience of policy years 2013 to 2016, which covers policies incepting January 1, 2013 through December 31, 2016 and includes injuries occurring over calendar years 2013 and 2017.

Results

This study is based on first report level unit statistical data for policy year 2016 that was linked with the WCIRB's medical transactional data and Dun and Bradstreet's Hoover's (Hoover's) data. The Hoover's data was used to geolocate exposures by classification.

The WCIRB's medical transactional data was used to geolocate claims. The methods used in this study are discussed in greater detail in the **Technical Appendix**.

2018 WCIRB Geo Study

A Report on California Regional Differences

Exhibits

Geographic Regions

Exhibit 1

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

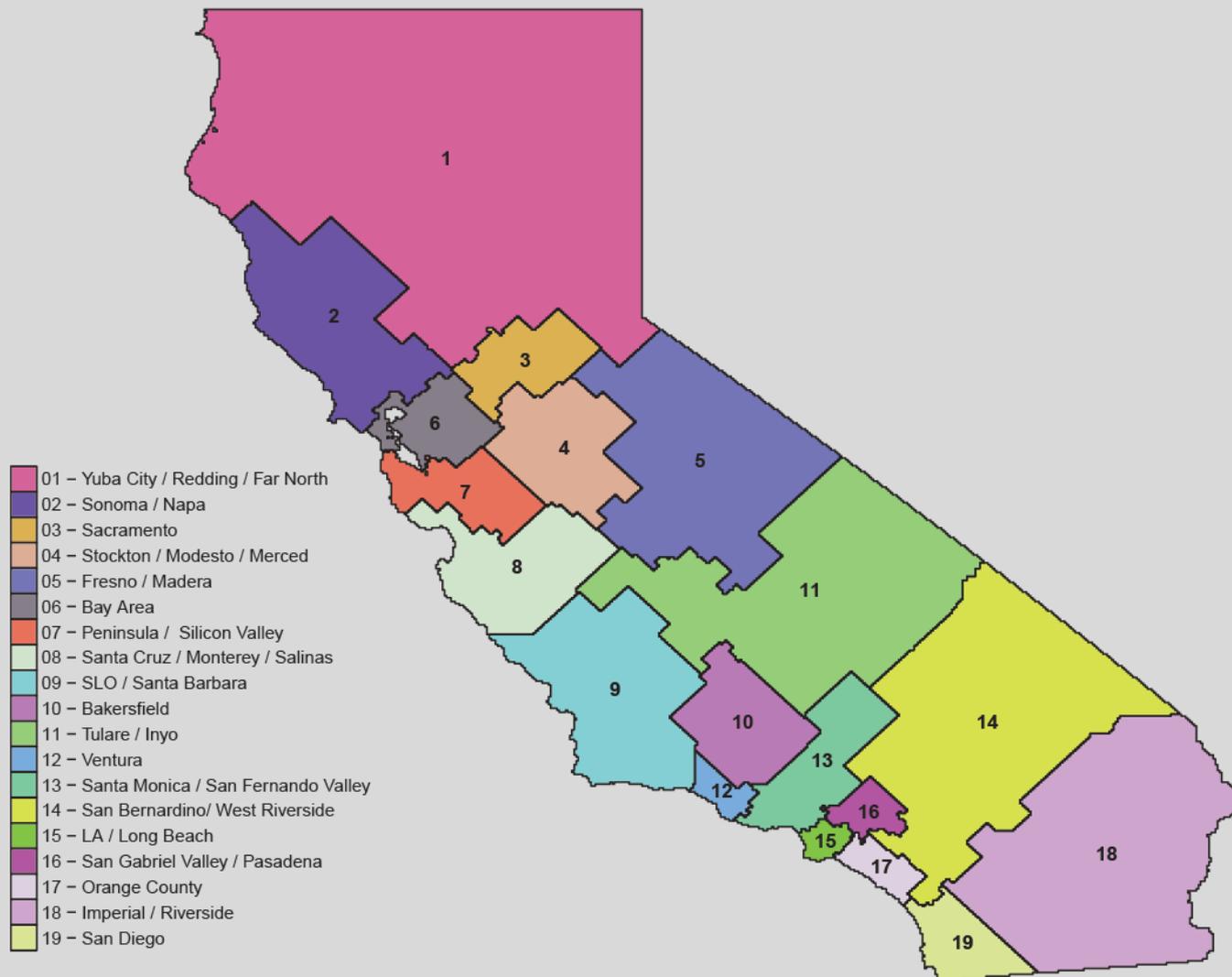
[Appendix](#)

[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)



Description

- This map of the regions was developed by WCIRB staff.
- A mapping of nine-digit zip codes to the study regions is available in the **Research and Analysis** section of the WCIRB website.
- The mapping also provides the regional wage relativities used to normalized payrolls across regions.

Indemnity Claim Frequency Relative to Statewide

[Exhibit 1](#)

Exhibit 2

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

[Appendix](#)

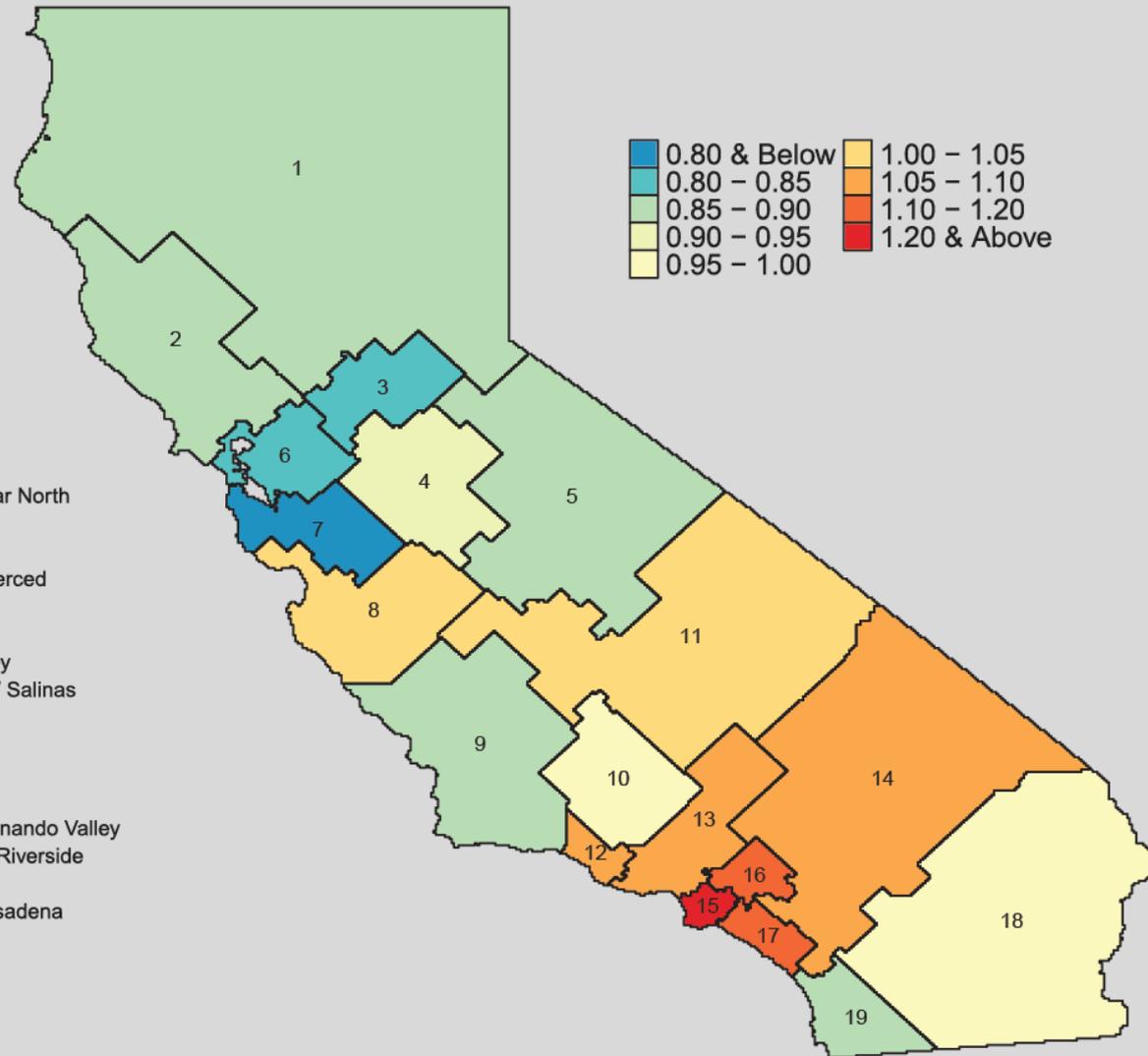
[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

- 01 – Yuba City / Redding / Far North
- 02 – Sonoma / Napa
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- 04 – Stockton / Modesto / Merced
- 05 – Fresno / Madera
- 06 – Bay Area
- 07 – Peninsula / Silicon Valley
- 08 – Santa Cruz / Monterey / Salinas
- 09 – SLO / Santa Barbara
- 10 – Bakersfield
- 11 – Tulare / Inyo
- 12 – Ventura
- 13 – Santa Monica / San Fernando Valley
- 14 – San Bernardino / West Riverside
- 15 – LA / Long Beach
- 16 – San Gabriel Valley / Pasadena
- 17 – Orange County
- 18 – Imperial / Riverside
- 19 – San Diego



Insights

- For policy year 2016, claim frequencies for the Los Angeles area continue to be higher than the statewide average while claim frequencies for the Bay Area are lower even after controlling for industrial mix and wage level differences.
- The LA/Long Beach (15) region has the highest claim frequency, more than 32% above the average.
- The Peninsula/Silicon Valley (07) region has the lowest, almost 25% below average claim frequency.



[More Info](#) →

PY 2015 to 2016 Change in Indemnity Claim Frequency Relativity

[Exhibit 1](#)

[Exhibit 2](#)

Exhibit 3

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

[Appendix](#)

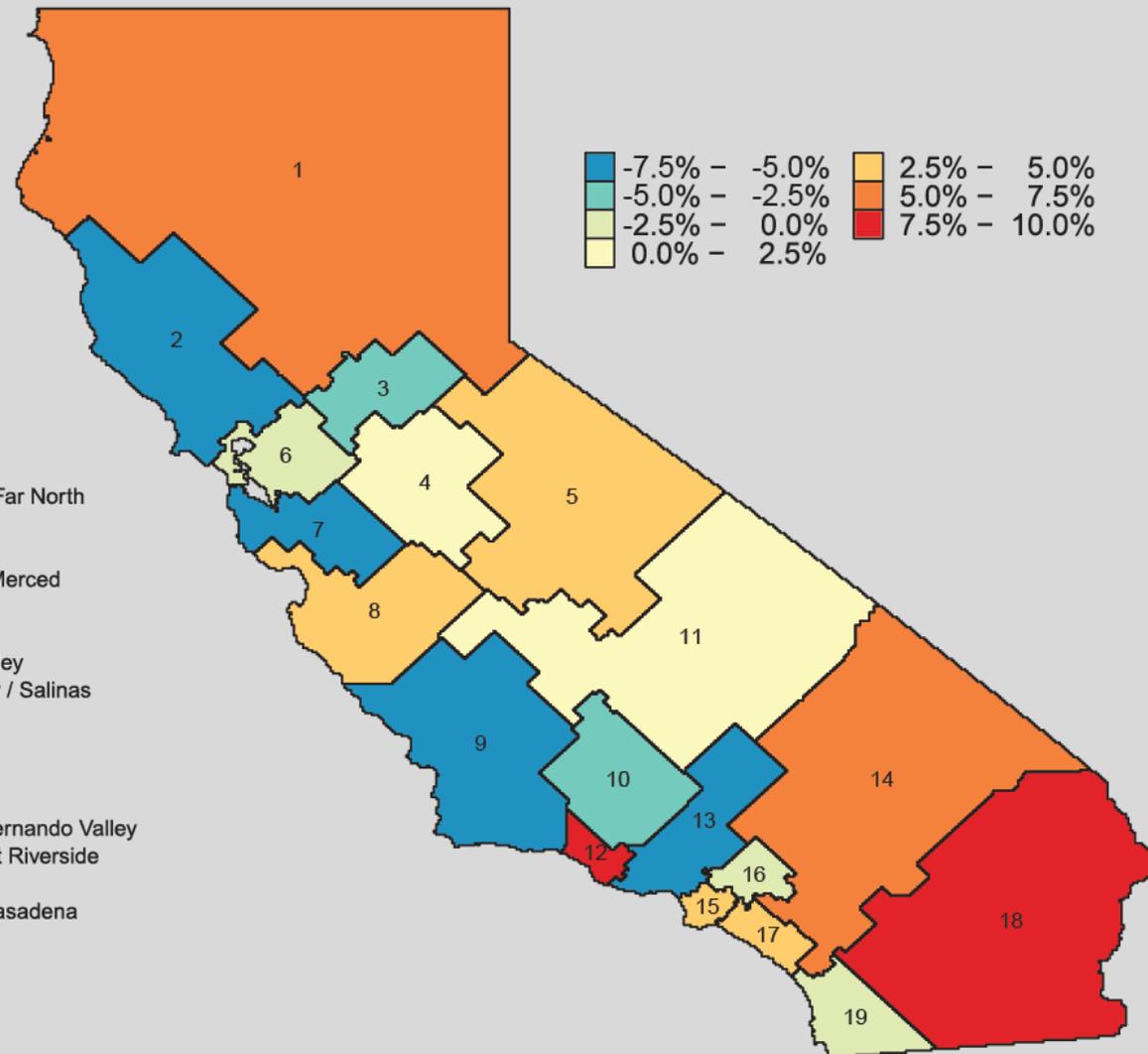
[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

- 01 – Yuba City / Redding / Far North
- 02 – Sonoma / Napa
- 03 – Sacramento
- 04 – Stockton / Modesto / Merced
- 05 – Fresno / Madera
- 06 – Bay Area
- 07 – Peninsula / Silicon Valley
- 08 – Santa Cruz / Monterey / Salinas
- 09 – SLO / Santa Barbara
- 10 – Bakersfield
- 11 – Tulare / Inyo
- 12 – Ventura
- 13 – Santa Monica / San Fernando Valley
- 14 – San Bernardino / West Riverside
- 15 – LA / Long Beach
- 16 – San Gabriel Valley / Pasadena
- 17 – Orange County
- 18 – Imperial / Riverside
- 19 – San Diego



Insights

- The Ventura (12), Orange County (17), and Imperial/Riverside (18) regions experienced continued deteriorating relativities in policy year 2016.
- The SLO/Santa Barbara (09) region shows the greatest improvement, while the Imperial/Riverside (18) region shows the greatest deterioration.



[More Info](#) →

Limited* Incurred Severity on Indemnity Claims Relative to Statewide

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

Exhibit 4

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

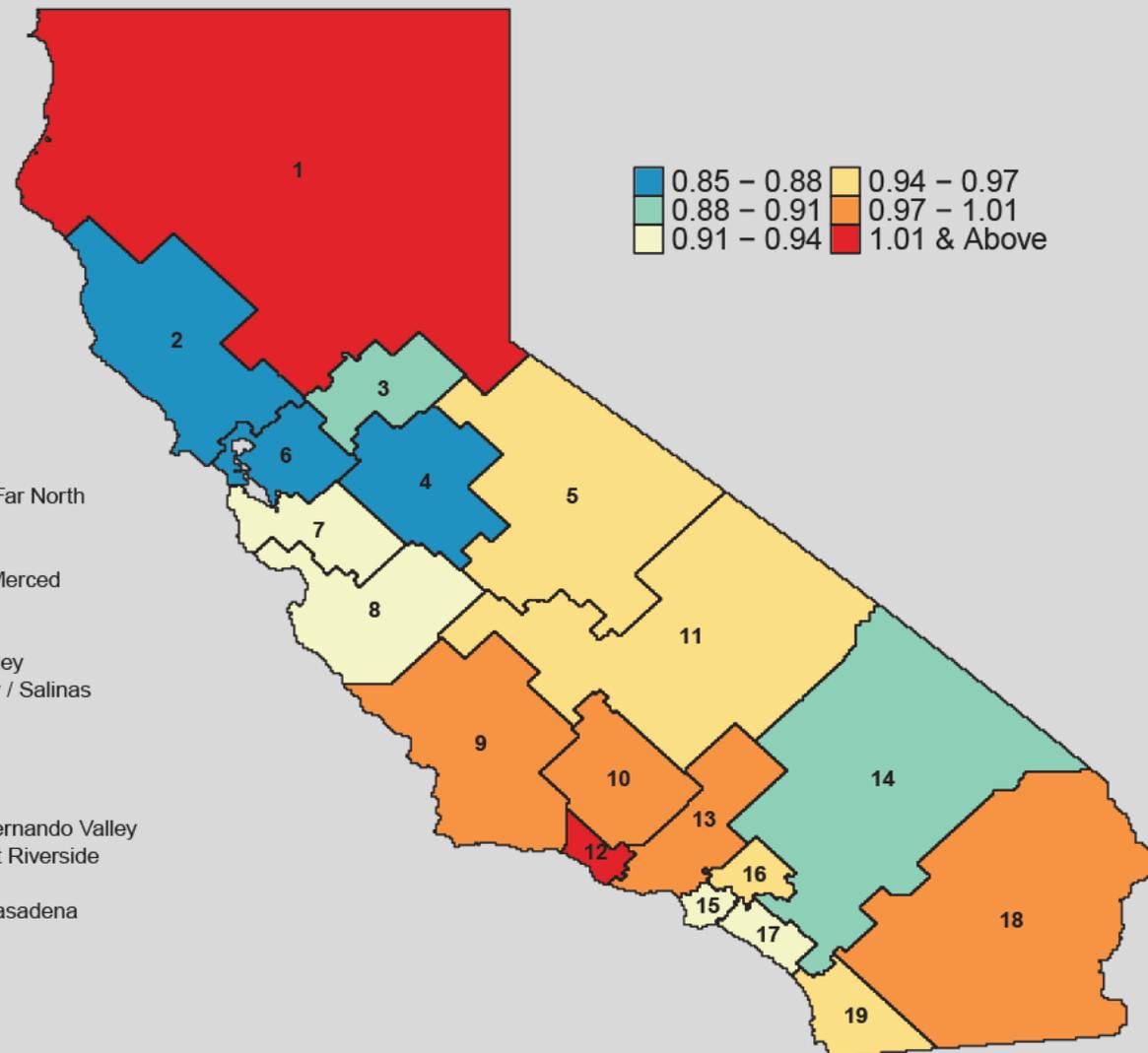
[Appendix](#)

[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)



- 01 – Yuba City / Redding / Far North
- 02 – Sonoma / Napa
- 03 – Sacramento
- 04 – Stockton / Modesto / Merced
- 05 – Fresno / Madera
- 06 – Bay Area
- 07 – Peninsula / Silicon Valley
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- 09 – SLO / Santa Barbara
- 10 – Bakersfield
- 11 – Tulare / Inyo
- 12 – Ventura
- 13 – Santa Monica / San Fernando Valley
- 14 – San Bernardino / West Riverside
- 15 – LA / Long Beach
- 16 – San Gabriel Valley / Pasadena
- 17 – Orange County
- 18 – Imperial / Riverside
- 19 – San Diego



Insights

- Regional differences in indemnity claim severity are more muted than for claim frequency.
- The highest severity cost region in the state is the Ventura (12) Region.
- The lowest severity costs are in the Stockton/Modesto/Merced (04) region.

* Limited to \$500,000



[More Info](#) →

Median Injured Worker's Average Weekly Wage

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

Exhibit 5

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

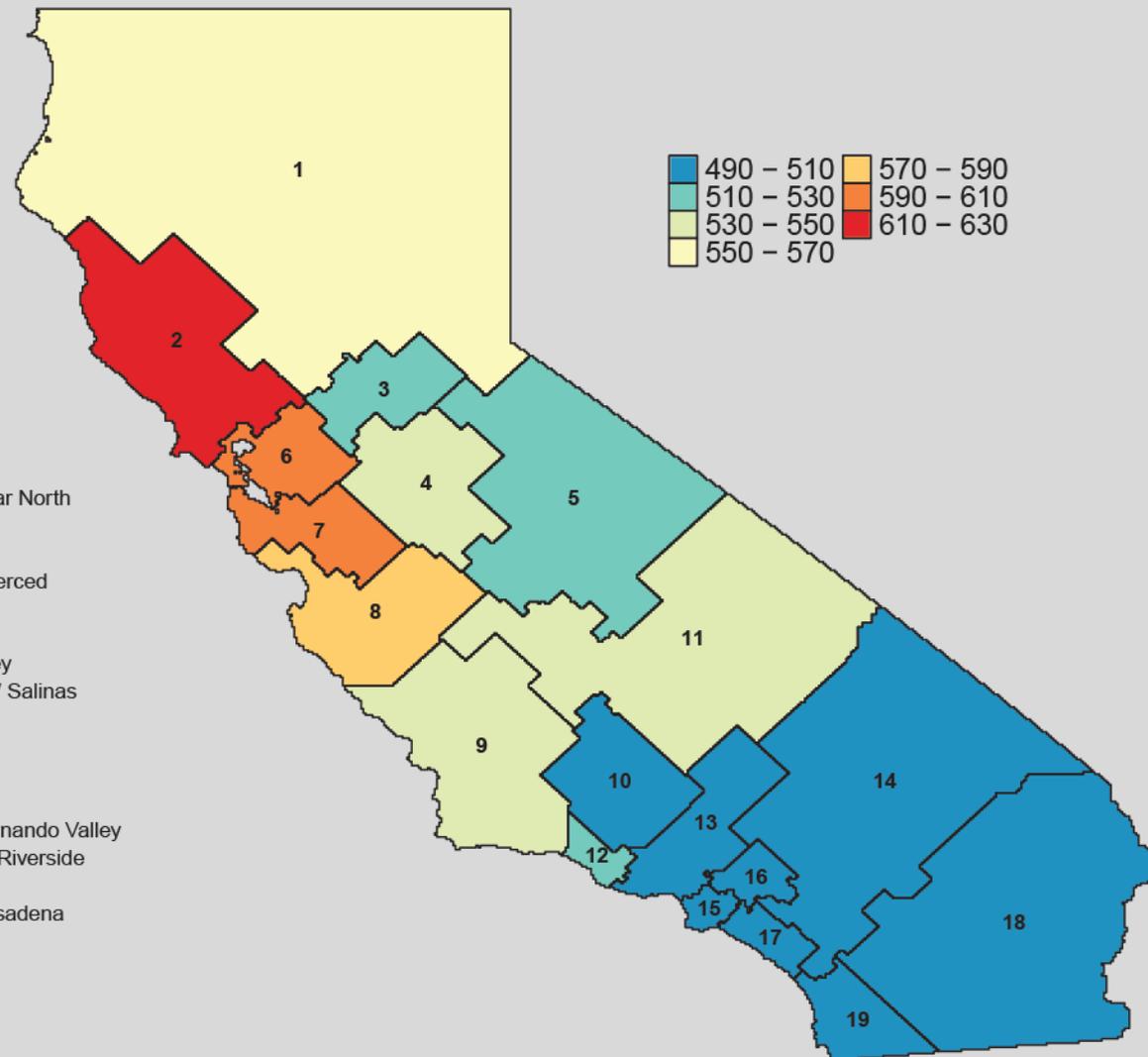
[Appendix](#)

[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)



- 01 - Yuba City / Redding / Far North
- 02 - Sonoma / Napa
- 03 - Sacramento
- 04 - Stockton / Modesto / Merced
- 05 - Fresno / Madera
- 06 - Bay Area
- 07 - Peninsula / Silicon Valley
- 08 - Santa Cruz / Monterey / Salinas
- 09 - SLO / Santa Barbara
- 10 - Bakersfield
- 11 - Tulare / Inyo
- 12 - Ventura
- 13 - Santa Monica / San Fernando Valley
- 14 - San Bernardino / West Riverside
- 15 - LA / Long Beach
- 16 - San Gabriel Valley / Pasadena
- 17 - Orange County
- 18 - Imperial / Riverside
- 19 - San Diego



Insights

- The highest wages in the state are in Sonoma/Napa (02), the Bay Area (06), and the Peninsula/Silicon Valley (07).
- Wages are lower throughout most of the southern part of the state.



[More Info](#) →

Permanent Disability Claims as a Share of Indemnity Claims

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

Exhibit 6

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

[Appendix](#)

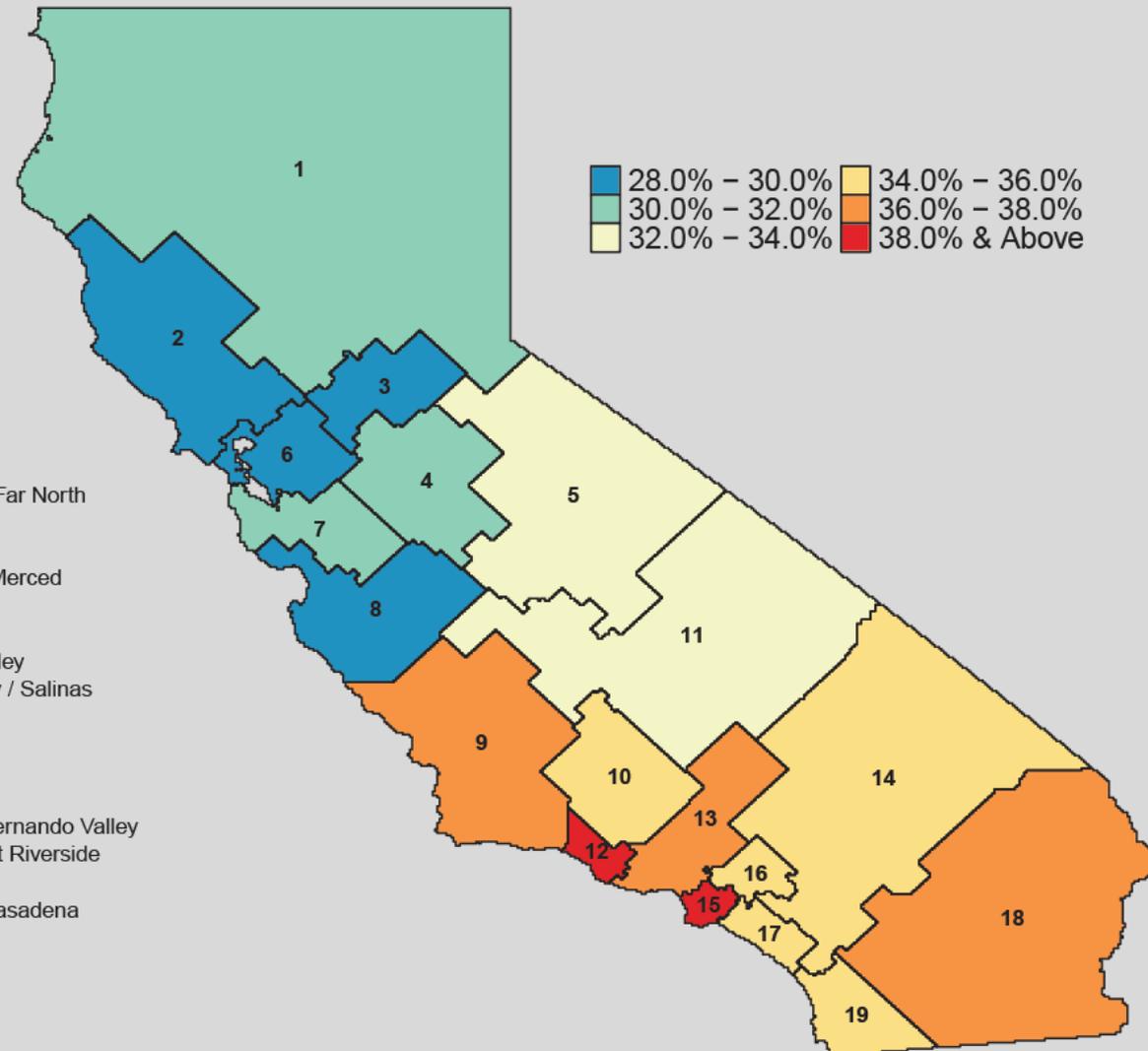
[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

- 01 – Yuba City / Redding / Far North
- 02 – Sonoma / Napa
- 03 – Sacramento
- 04 – Stockton / Modesto / Merced
- 05 – Fresno / Madera
- 06 – Bay Area
- 07 – Peninsula / Silicon Valley
- 08 – Santa Cruz / Monterey / Salinas
- 09 – SLO / Santa Barbara
- 10 – Bakersfield
- 11 – Tulare / Inyo
- 12 – Ventura
- 13 – Santa Monica / San Fernando Valley
- 14 – San Bernardino / West Riverside
- 15 – LA / Long Beach
- 16 – San Gabriel Valley / Pasadena
- 17 – Orange County
- 18 – Imperial / Riverside
- 19 – San Diego



Insights

- The shares of indemnity claims that are permanent disability claims are higher in Southern California than in Northern California.
- In the LA/Long Beach (15) and Ventura (12) regions about 40% of indemnity claims involve permanent disability, while some Northern California regions involve 30% or less.
- As permanent disability claims are more costly than temporary indemnity claims, regional differences in their shares explain some of the regional cost differences.



[More Info](#) →

Cumulative Trauma Claims as a Share of Total Claims

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

Exhibit 7

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

[Appendix](#)

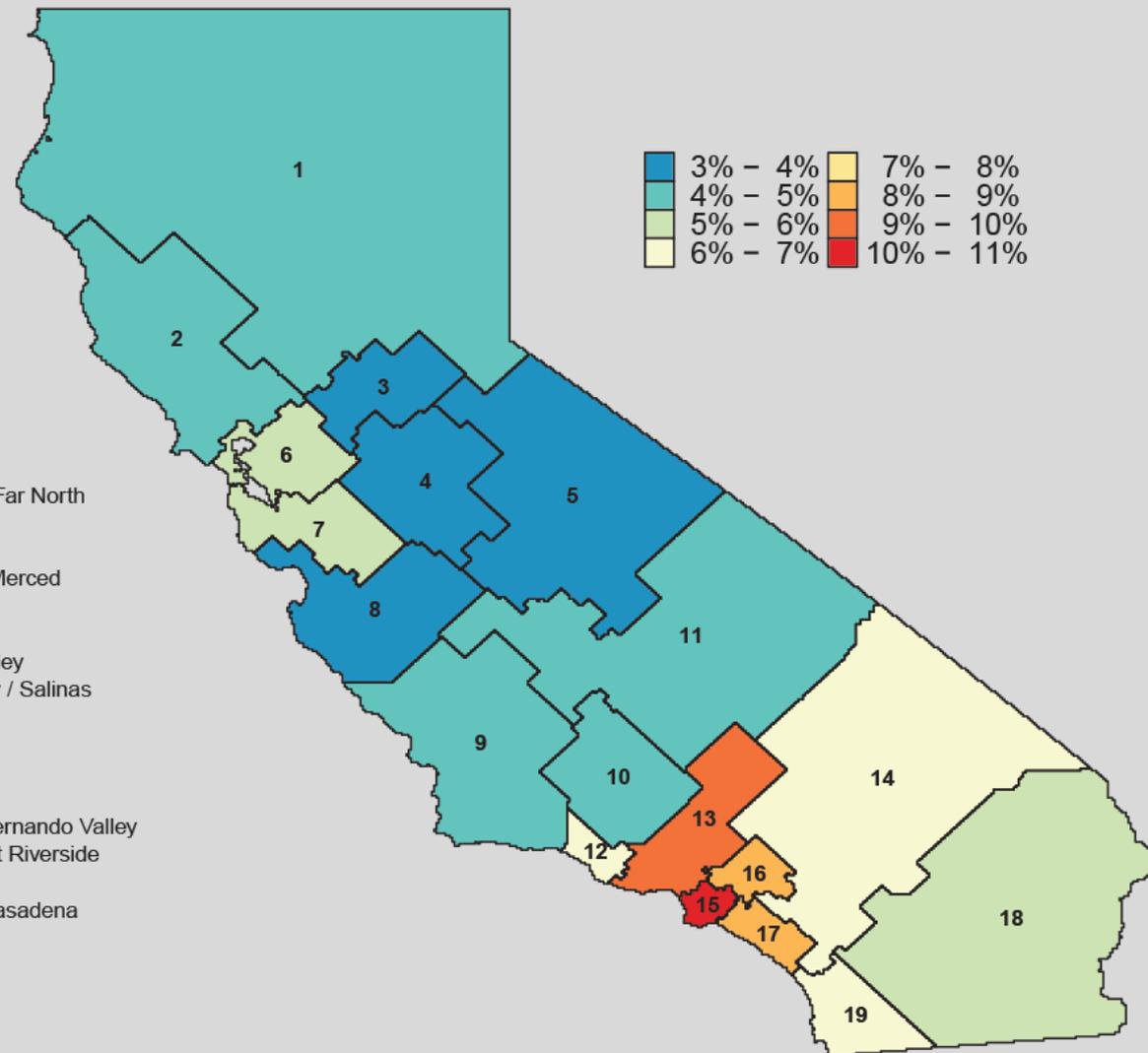
[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

- 01 – Yuba City / Redding / Far North
- 02 – Sonoma / Napa
- 03 – Sacramento
- 04 – Stockton / Modesto / Merced
- 05 – Fresno / Madera
- 06 – Bay Area
- 07 – Peninsula / Silicon Valley
- 08 – Santa Cruz / Monterey / Salinas
- 09 – SLO / Santa Barbara
- 10 – Bakersfield
- 11 – Tulare / Inyo
- 12 – Ventura
- 13 – Santa Monica / San Fernando Valley
- 14 – San Bernardino / West Riverside
- 15 – LA / Long Beach
- 16 – San Gabriel Valley / Pasadena
- 17 – Orange County
- 18 – Imperial / Riverside
- 19 – San Diego



Insights

- The incidence of cumulative trauma claims is significantly higher in the Los Angeles area and most other parts of Southern California.
- WCIRB research has shown that cumulative trauma claims frequently involve multiple body parts or a specific injury, are litigated, are initially denied in part or in whole and are often filed on a post termination basis.



[More Info](#) →

Share of Indemnity Claims with a Medical Legal Report

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

Exhibit 8

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

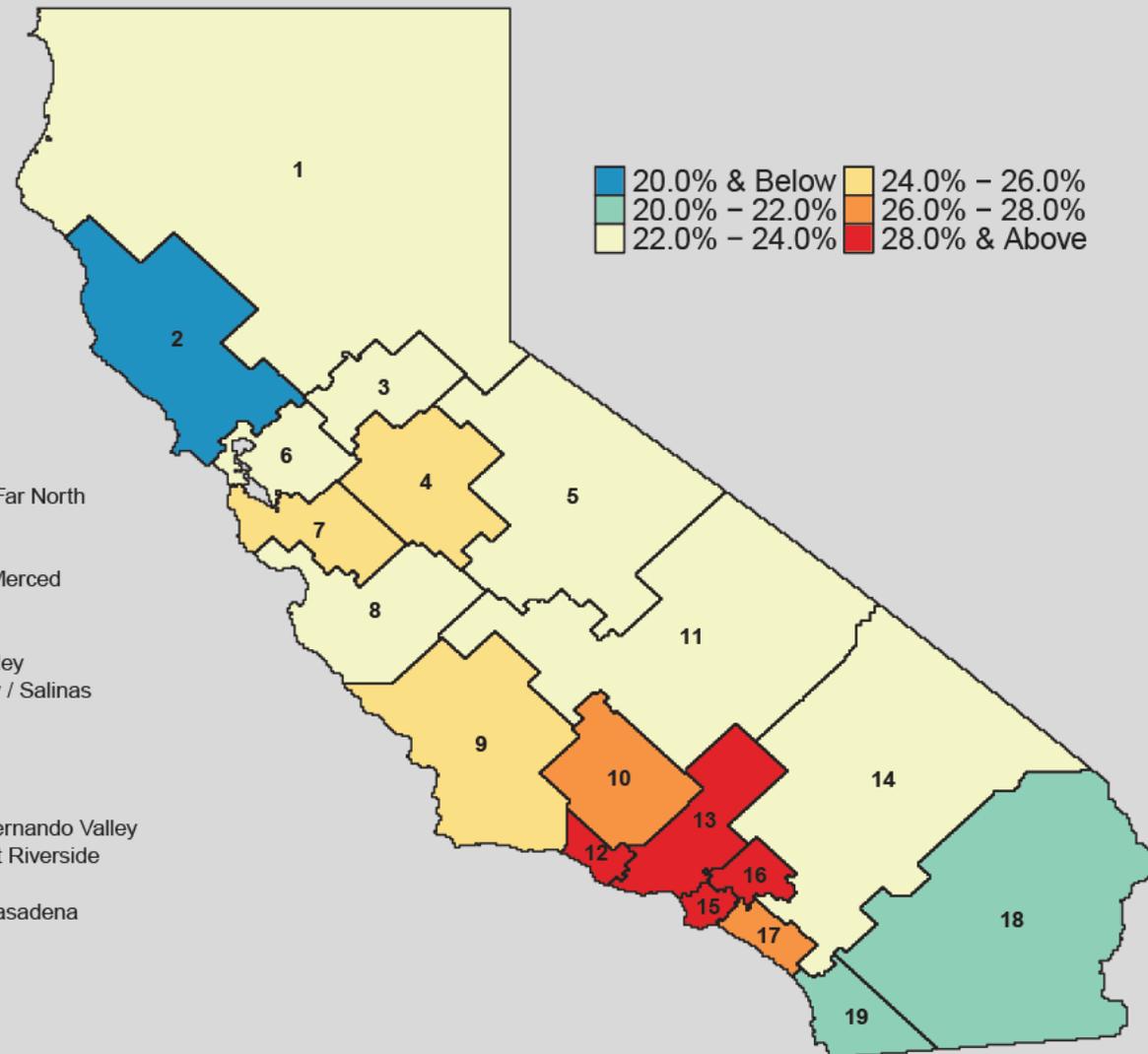
[Appendix](#)

[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)



- 01 - Yuba City / Redding / Far North
- 02 - Sonoma / Napa
- 03 - Sacramento
- 04 - Stockton / Modesto / Merced
- 05 - Fresno / Madera
- 06 - Bay Area
- 07 - Peninsula / Silicon Valley
- 08 - Santa Cruz / Monterey / Salinas
- 09 - SLO / Santa Barbara
- 10 - Bakersfield
- 11 - Tulare / Inyo
- 12 - Ventura
- 13 - Santa Monica / San Fernando Valley
- 14 - San Bernardino / West Riverside
- 15 - LA / Long Beach
- 16 - San Gabriel Valley / Pasadena
- 17 - Orange County
- 18 - Imperial / Riverside
- 19 - San Diego



Insights

- Medical legal reports in the Los Angeles Basin are significantly more frequent than in the rest of the state.



[More Info](#) →

PY 2015 to 2016 Percentage Point Change in Pharmaceutical Share

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

Exhibit 9

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

[Appendix](#)

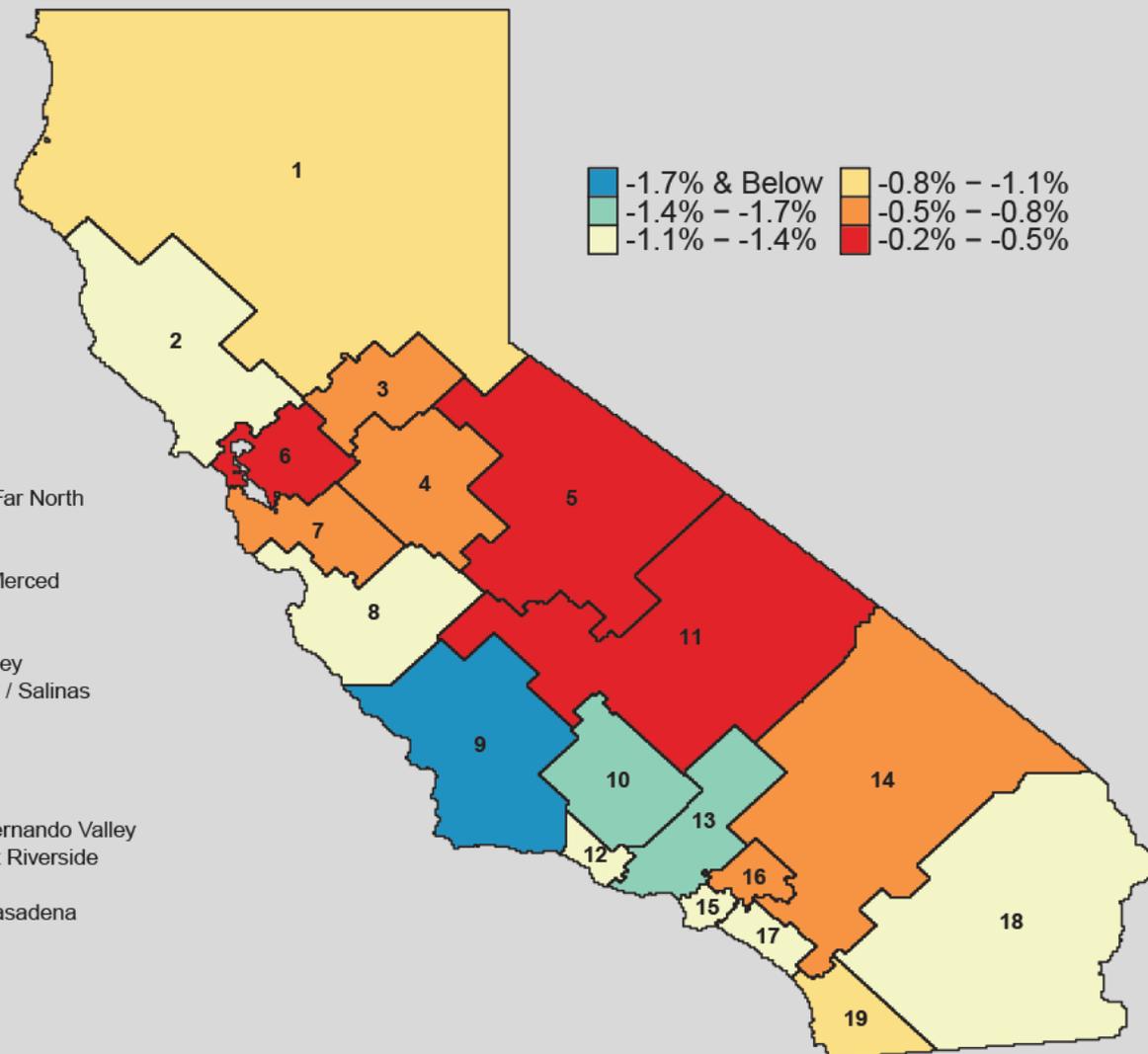
[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

- 01 – Yuba City / Redding / Far North
- 02 – Sonoma / Napa
- 03 – Sacramento
- 04 – Stockton / Modesto / Merced
- 05 – Fresno / Madera
- 06 – Bay Area
- 07 – Peninsula / Silicon Valley
- 08 – Santa Cruz / Monterey / Salinas
- 09 – SLO / Santa Barbara
- 10 – Bakersfield
- 11 – Tulare / Inyo
- 12 – Ventura
- 13 – Santa Monica / San Fernando Valley
- 14 – San Bernardino / West Riverside
- 15 – LA / Long Beach
- 16 – San Gabriel Valley / Pasadena
- 17 – Orange County
- 18 – Imperial / Riverside
- 19 – San Diego



Insights

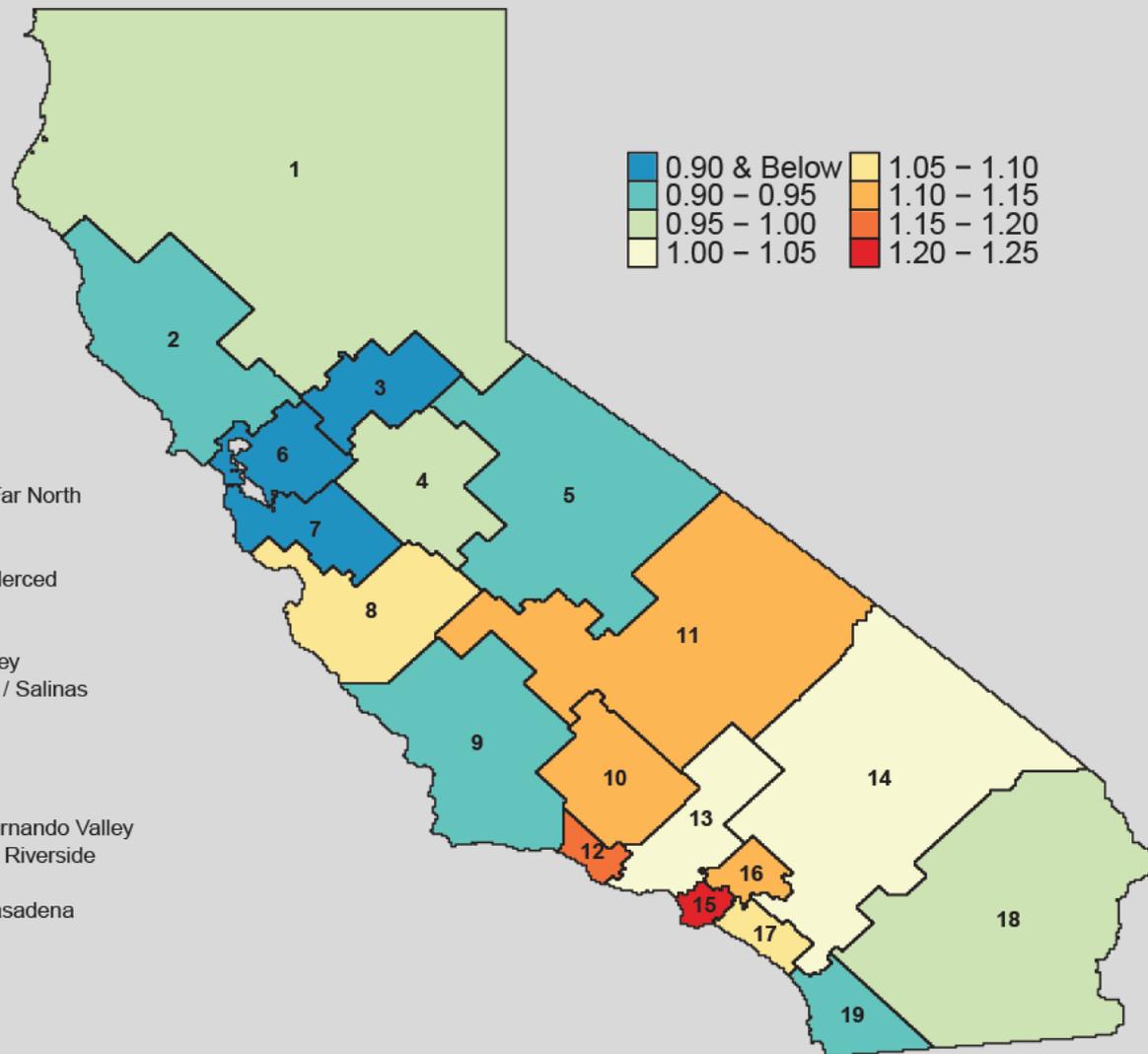
- The pharmaceutical share of paid medical have fallen in every region during each of the past three years.
- The pharmaceutical share of paid medical has fallen significantly, from nearly 7% to less than 2.5% over this time.



[More Info](#) →

Ratio of Limited* Losses to Modified Pure Premium

- [Exhibit 1](#)
- [Exhibit 2](#)
- [Exhibit 3](#)
- [Exhibit 4](#)
- [Exhibit 5](#)
- [Exhibit 6](#)
- [Exhibit 7](#)
- [Exhibit 8](#)
- [Exhibit 9](#)
- Exhibit 10**
- [Exhibit 11](#)
- [Exhibit 12](#)
- [Appendix](#)
- [More Info](#)
- [Geo Data Table](#)
- [Interactive Map](#)
- [Geo Zip Region](#)



- 01 - Yuba City / Redding / Far North
- 02 - Sonoma / Napa
- 03 - Sacramento
- 04 - Stockton / Modesto / Merced
- 05 - Fresno / Madera
- 06 - Bay Area
- 07 - Peninsula / Silicon Valley
- 08 - Santa Cruz / Monterey / Salinas
- 09 - SLO / Santa Barbara
- 10 - Bakersfield
- 11 - Tulare / Inyo
- 12 - Ventura
- 13 - Santa Monica / San Fernando Valley
- 14 - San Bernardino / West Riverside
- 15 - LA / Long Beach
- 16 - San Gabriel Valley / Pasadena
- 17 - Orange County
- 18 - Imperial / Riverside
- 19 - San Diego



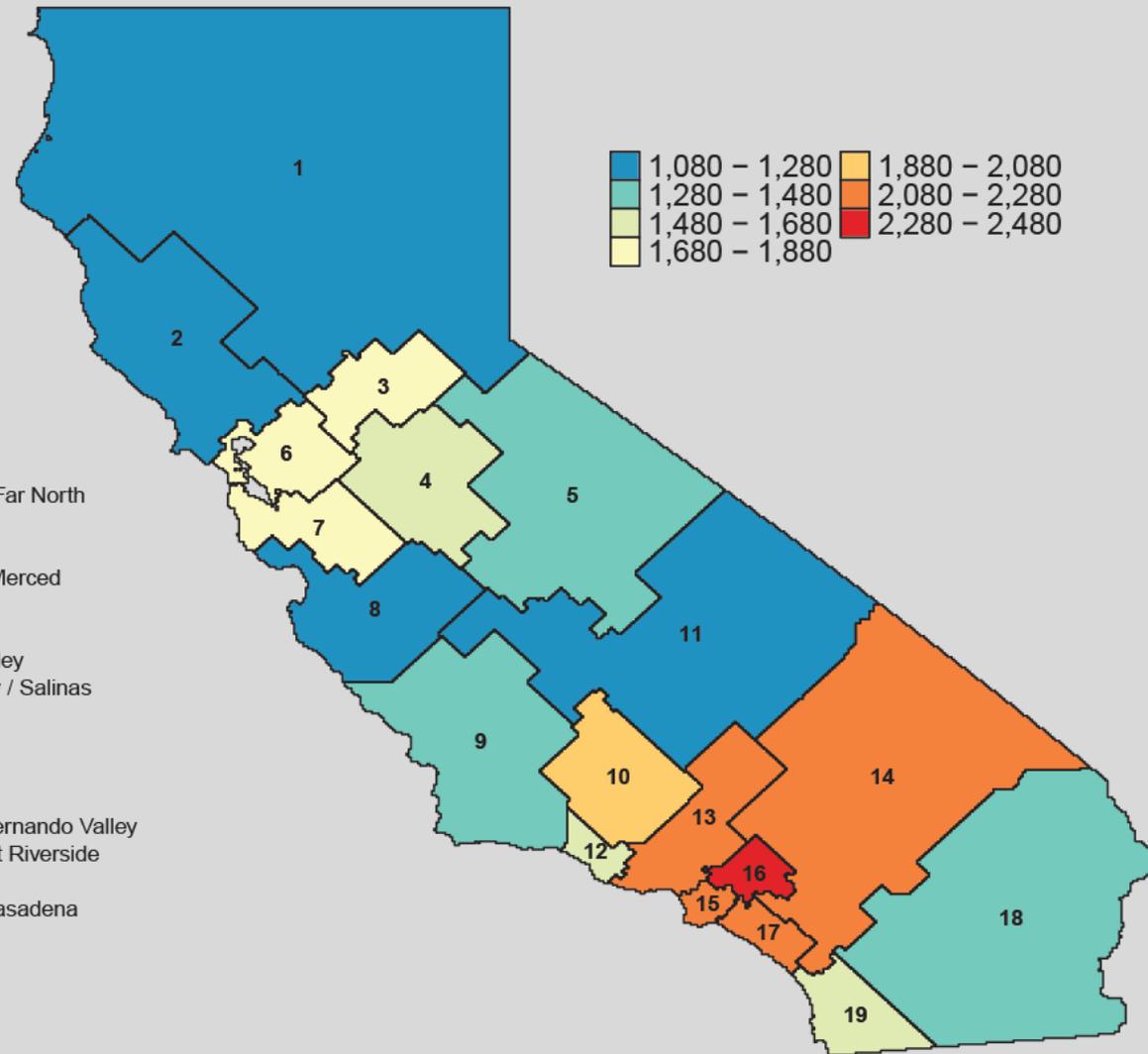
Insights

- Loss ratios are highest in the LA/Long Beach (15) region and lowest in the Sacramento (03) region.

* Limited to \$500,000

Median Paid ALAE on Permanent Disability Claims

- [Exhibit 1](#)
- [Exhibit 2](#)
- [Exhibit 3](#)
- [Exhibit 4](#)
- [Exhibit 5](#)
- [Exhibit 6](#)
- [Exhibit 7](#)
- [Exhibit 8](#)
- [Exhibit 9](#)
- [Exhibit 10](#)
- [Exhibit 11](#)**
- [Exhibit 12](#)
- [Appendix](#)
- [More Info](#)
- [Geo Data Table](#)
- [Interactive Map](#)
- [Geo Zip Region](#)



- 01 – Yuba City / Redding / Far North
- 02 – Sonoma / Napa
- 03 – Sacramento
- 04 – Stockton / Modesto / Merced
- 05 – Fresno / Madera
- 06 – Bay Area
- 07 – Peninsula / Silicon Valley
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- 09 – SLO / Santa Barbara
- 10 – Bakersfield
- 11 – Tulare / Inyo
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- 18 – Imperial / Riverside
- 19 – San Diego

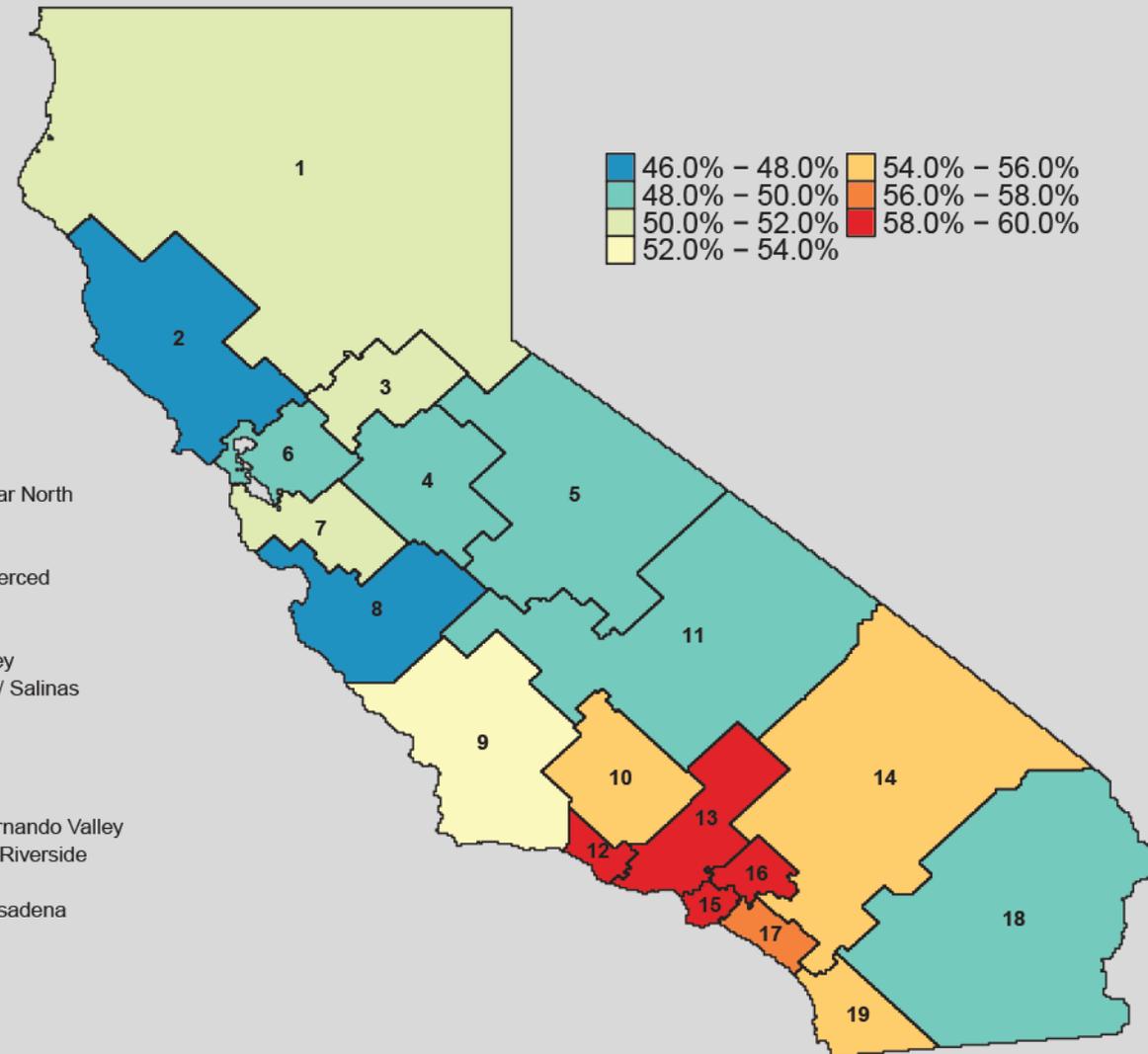


Insights

- Paid ALAE is significantly higher in the Los Angeles Basin. The lowest ALAE costs tend to be in the more rural areas of the state.
- The statewide median paid ALAE increased over 9% from 2015 to 2016. Increases were experienced in nearly all regions.
- The change was driven by ALAE payments on open claims. Paid ALAE for closed claims can be seen in **T11d**.

Open Share of Indemnity Claims

- [Exhibit 1](#)
- [Exhibit 2](#)
- [Exhibit 3](#)
- [Exhibit 4](#)
- [Exhibit 5](#)
- [Exhibit 6](#)
- [Exhibit 7](#)
- [Exhibit 8](#)
- [Exhibit 9](#)
- [Exhibit 10](#)
- [Exhibit 11](#)
- Exhibit 12**
- [Appendix](#)
- [More Info](#)
- [Geo Data Table](#)
- [Interactive Map](#)
- [Geo Zip Region](#)



Insights

- The share of indemnity claims that are open at first report level is significantly higher in Southern California relative to the rest of the state.

2018 WCIRB Geo Study

A Report on California Regional Differences

Appendix

Technical Appendix

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

Appendix

[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

Increasing anecdotal evidence of geographical differences in California workers' compensation claim costs led WCIRB staff to develop a database that could provide refined estimates of regional claim frequencies and other claim cost differentials. This database resolves two problems with unit statistical report (USR) data, which does not provide geographic information for exposures or claims.

The first problem is determining the appropriate allocation of USR exposures by classification to geographic locations. This problem was resolved by linking the WCIRB's USR data to Hoover's data, which provides information on employer locations, including the industries at each location and estimates of the number of employees at each location. The second problem is determining the appropriate allocation of claims to employer locations. This problem was resolved by using the geographic information for select data available in the WCIRB's medical data call (MDC). The resulting triple-linked database—USR, MDC and Hoover's—provides an enriched database that allows for more refined analyses of geographical differences across California.

The exposure and claim geolocating protocols benefited greatly from the voluntary participation of several insurers who reviewed samples of exposure and claim allocations for their policies.

In addition to the three primary data sources used to form the triple-linked database, WCIRB staff also utilized the following sources:

- WCIRB policy and inspection report data (for names and addresses)
- Occupational Employment Survey (to develop regional wage adjustments)
- Self-Insurance Rosters of the Division of Workers Compensation's Self Insurance Program

Methods of Linkage—USR to Hoover's

Multiple methods were used to link USR and Hoover's data. Linkages were established using employer names (including owner/proprietor, Doing Business As, and parent company names), addresses, and Federal Employer Identification Numbers. A protocol was established among linkage methods to avoid ambiguity. Ambiguously matched data was excluded from the study.

In studies prior to 2016, there was a significant temporal mismatch between the WCIRB's policy year USR data and the Hoover's data, which was as of January 5, 2015. This mismatch was not immaterial. Hoover's identifies newly founded employer locations. In the 2016 study, approximately 3.5% of Hoover's records were identified as founded after the USR inception dates included in the study. A comparable share of USR data was likely associated with employers that went out of business between the study period and the timing of the Hoover's data capture. Additionally, employers move, which can prevent matching on employer addresses. In spite of these obstacles, staff was able to develop a credible database that represented approximately 92% of the target policy year's data. The missing data was evaluated for its potential to bias regional differentials and no significant biases were found.

Over time, the availability of contemporaneous Hoover's and USR data has ameliorated many of these problems and allowed for enhanced USR-Hoover's match rates. In the 2018 study, approximately 93% of the target policy year's data was successfully matched.

In parallel with linking the USR and Hoover's data, WCIRB staff also matched Hoover's data to the self-insurance rosters published by the California Division of Workers' Compensation's Self Insurance Program. Self-insured employers identified in the Hoover's data were then excluded from matching with USR data to increase the overall quality of the matching.

Technical Appendix (...continued)

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

Appendix

[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

Methods of Linkage—USR to MDC

The USR data was linked with MDC data using insurer, policy and claim number matching. While more straightforward, the linkages between these datasets are not complete. Not all insurers participate in MDC. For the study period, approximately 11% of insured data was not in MDC because the insurer did not participate in MDC. Matching was done, and employer experience included, at the policy level. For example, for an employer insured by two insurers, one of which participated in MDC while the other did not participate in MDC, only the experience of the insurer that participated in MDC was included. Further, only claims that were medically active and for which data was submitted to MDC are available in MDC. USR claims for which there were no medical payments captured in MDC will not be available to match with MDC. Settlements paid directly to injured workers, for example, typically would not be captured in MDC. The claim experience captured in the study, therefore, represents a subset of all claim experience. No regional biases were detected due to excluding this data.

Geolocating Exposures

Exposures were allocated to locations recognizing regional wage differentials (developed from the Occupational Employment Survey) and the relative number of employees estimated by Hoover's to be at each location. Each classification's exposures were allocated to locations using the industries at the location provided by Hoover's. Note that the regional wage differentials are by county—not by WCIRB region. The regional wage differentials used in the study are provided in the zip code-to-region mapping.

Geolocating Claims

Claims were allocated to locations at which the claim's classification had exposure allocated. Claims were located to the nearest such location by calculating the location of each claim's 'center of medical services' determined from MDC observations. All MDC features were used to geolocate claims. Features were weighted in proportion to their accuracy in geolocating so that features that provide good geolocating information receive greater weight than features that provide poor geolocating information. The average number of MDC observations used to geolocate a claim was 32.9.

Identifying Optimal Geographic Units of Analysis

A market area approach was used to identify economically cohesive geographical units. To identify economically cohesive geographical units, WCIRB staff examined the "correlation" of medical providers among geographic units. The idea is that regions utilizing common providers form a more natural geographic unit.

To identify economically cohesive geographical units, WCIRB staff first identified the minimum number of claims required in a geographic unit for reasonably stable results. A selection of 130 claims was made based on reviewing the clustering patterns for geographical units with greater claim volumes and identifying the volumes below which the ability to detect previously identified and stable clusters deteriorated. The average geolocated claim's number of MDC observations used in geolocating was 32.9, so the expected number of geolocating MDC observations for a geographic unit with 130 claims was 4,277.

Staff then developed a customized grid for the state for which each cell had at least 130 claims. Cells varied in geographic area as required to include at least 130 claims. Cells smaller than 1.3mi² in geographic area but with more than 130 claims were not subdivided. The provider "correlation" matrix for the grid was then calculated. If two geographic units had half of the providers in common, then the "correlation" between the two units was 0.50. The provider "correlations" range between zero and unity. The statewide average provider "correlation" across the grid was 0.12.

Technical Appendix (...continued)

Unity less the provider “correlation” was used as a measure of dissimilarity between geographic units. Cluster analysis using Ward’s 2D linkage criterion was then performed using this measure of dissimilarity. The cluster analysis algorithm first divided the state into two clusters such that the dissimilarity within the clusters is minimized. This process was repeated iteratively for each division until a desired number of clusters was reached. WCIRB staff evaluated a range of clusters and selected 19 as striking a good balance between robustness in the geographic units’ results and the level of refinement. The average provider “correlation” for the selected 19 geographic regions is 0.40.

A mapping of U.S. Postal Service nine-digit zip codes to the study regions is available in the [Research and Analysis](#) section of the [WCIRB website](#). The mapping includes the regional wage differentials. Note that an accurate mapping requires the use of the nine-digit, or zip plus 4, codes. Regions are not uniquely identified at the five-digit zip code level and five-digit zip codes may map to multiple regions.

Let us know what you think by emailing us at ActuarialResearch@wcirb.com



[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

Appendix

[More Info](#)

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

2018 WCIRB Geo Study

A Report on California Regional Differences

More Info

More Info

- [Exhibit 1](#)
- [Exhibit 2](#)
- [Exhibit 3](#)
- [Exhibit 4](#)
- [Exhibit 5](#)
- [Exhibit 6](#)
- [Exhibit 7](#)
- [Exhibit 8](#)
- [Exhibit 9](#)
- [Exhibit 10](#)
- [Exhibit 11](#)
- [Exhibit 12](#)
- [Appendix](#)
- More Info**
- [Geo Data Table](#)
- [Interactive Map](#)
- [Geo Zip Region](#)

Exhibit 2: Indemnity Claim Frequency Relative to Statewide

- This map shows the regional indemnity claim frequency relative to statewide controlled for industrial mix and wage level differences. The expected statewide frequencies were developed at a classification level.
- The regional indemnity claim frequency relativities for policy years 2013 through 2016 are provided on tab **T2** of the Geo Data Table.
- The regional total claim frequency relativities (not mapped) for policy years 2013 through 2016 are provided on tab **T3a** of the Geo Data Table.



- The regional total incurred severity relativities for indemnity claims for policy years 2013 to 2016 are provided on tab **T4** of the Geo Data Table.
- The regional incurred indemnity severity relativities for policy years 2013 to 2016 are provided on tab **T4a** of the Geo Data Table.
- The regional medical incurred severity relativities for indemnity claims for policy years 2013 to 2016 are provided on tab **T4b** of the Geo Data Table.



Exhibit 3: PY 2014 to 2015 Change in Indemnity Claim Frequency Relativity

- This map shows the percentage point change in indemnity claim frequency relativity from policy year 2015 to policy year 2016.
- The data underlying this map as well changes in prior policy years are provided on tab **T3** of the Geo Data Table.



Exhibit 5: Median Injured Worker's Average Weekly Wage

- This map shows the policy year 2016 median injured worker's average weekly wage for geolocated claims. Each region's median injured worker's average weekly wage for policy years 2013 to 2016 are provided on tab **T5** of the Geo Data Table.
- The median injured worker's age for claims with permanent disability for policy years 2013 to 2016 (not mapped) is provided on tab **T5a** of the Geo Data Table.



Exhibit 4: Limited Incurred Severity on Indemnity Claims Relative to Statewide

- This map shows total incurred severity on indemnity claims, controlled for classification mix, relative to statewide.
- These indemnity severities are at first report level, with all losses limited to \$500,000, and are not necessarily the indemnity severities ultimately expected as claims mature.



More Info (...continued)

[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

[Appendix](#)

More Info

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

Exhibit 6: Permanent Disability Claims as a Share of Indemnity Claims

- This map shows the policy year 2016, at first report level, regional shares of indemnity claims that are permanent disability.
- Each region's permanent disability share of indemnity claims for policy years 2013 to 2016 are provided on tab **T6** of the Geo Data Table. Each region's indemnity claim share of total claims for policy years 2013 to 2016 (not mapped) are provided on tab **T6a** of the Geo Data Table.
- Higher shares of more costly indemnity claims explain some of the cost differences observed in **Exhibit 4**.



Exhibit 7: Cumulative Trauma Claims as a Share of Total Claims

- This map shows the share of all claims including medical only that are cumulative trauma or occupational disease by region for policy year 2016.
- These shares are at first report level and do not reflect the shares ultimately expected. The cumulative injury shares by region for policy years 2013 to 2016 are provided on tab **T7** of the Geo Data Table.



Exhibit 8: Share of Indemnity Claims with a Medical Legal Report

- This map shows the policy year 2015, at first report level, share of indemnity claims with a medical-legal report.
- Medical-legal reports are used to address disputed issues and are expected to be more frequent for permanent disability claims.
- The incidence of medical-legal reports beyond that explained by differences in permanent disability shares suggests a degree of litigiousness.
- The regional shares of indemnity claims with a medical-legal report for policy years 2013 to 2016 are provided on tab **T8** of the Geo Data Table. The regional median permanent disability rating for policy years 2013 to 2016 (not mapped) are provided on tab **T8a** of the Geo Data Table.
- The regional shares of medical legal costs paid on indemnity claims as a share of total incurred for policy years 2013 to 2016 are provided on tab **T8b** of the Geo Data Table.
- Generally, medical-legal costs are higher in Southern California relative to the rest of the state.



Exhibit 9: PY 2013 to 2015 Percentage Point Change in Pharmaceutical Share

- This map shows, by region, the change in medical paid-to-date for pharmaceuticals from policy year 2013 to 2016.
- The year-to-year changes in pharmaceuticals' share of paid medical is provided on tab **T9** of the Geo Data Table. Each policy year's share of paid medical that is for pharmaceuticals is provided on tab **T9a** of the Geo Data Table.



[Exhibit 1](#)

[Exhibit 2](#)

[Exhibit 3](#)

[Exhibit 4](#)

[Exhibit 5](#)

[Exhibit 6](#)

[Exhibit 7](#)

[Exhibit 8](#)

[Exhibit 9](#)

[Exhibit 10](#)

[Exhibit 11](#)

[Exhibit 12](#)

[Appendix](#)

More Info

[Geo Data Table](#)

[Interactive Map](#)

[Geo Zip Region](#)

More Info (...continued)

Exhibit 10: Ratio of Limited Losses to Modified Pure Premium

- This map shows regional loss ratio relativities after application of experience rating for experience rated employers for policy year 2016.
- Expected losses contemplate a \$500,000 per claim limit and are controlled for classification mix and regional wage level differences. Each claim's actual losses are limited to \$500,000.
- The limited losses are compared to the modified pure premium for those risks, which is the premium generated at the approved advisory pure premium rates adjusted by the applicable experience modifications.
- Exhibit 10 provides the most comprehensive picture of regional cost differentials.
- The regional loss ratio relativities for policy years 2013 to 2016 are provided on tab **T10** of the Geo Data Table.



Exhibit 11: Median Paid ALAE on Permanent Disability Claims

- This map shows the regional median paid allocated loss adjustment expense (ALAE) per permanent disability claim for policy year 2016.
- The regional median paid ALAE per permanent disability claim for policy years 2013 to 2016 is provided on tab **T11** of the Geo Data Table.
- The regional average paid ALAE per permanent disability claim for policy years 2013 to 2016 is provided on tab **T11a** of the Geo Data Table.
- The regional paid ALAE shares of incurred losses on permanent disability claims is provided on tab **T11b** of the Geo Data Table.

- The regional settlement distribution of closed permanent disability claims is provided on tab **T11c** of the Geo Data Table.
- The regional median paid ALAE per permanent disability claim by type of settlement is provided on tab **T11d** of the Geo Data Table.



Exhibit 12: Open Share of Indemnity Claims

- This map shows each region's share of indemnity claims that were reported as open at first report level for policy year 2016.
- The regional open shares for indemnity claims at first report level for policy years 2013 to 2016 is provided on tab **T12** of the Geo Data Table.
- The regional open shares for all claims at first report level for policy years 2013 to 2016 is provided on tab **T12a** of the Geo Data Table.



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