



# CARe Boot Camp: Pricing WC Excess of Loss Reinsurance

Joan Wei • 8/14/2019



# I Outline



## ❖ Workers Compensation Background

### ❖ Experience Rating WC

- Premium on-leveling
- Loss Trend
- Large Loss Development Factors
- Large Loss Benefit Level Changes

### ❖ Exposure Rating WC

- Hazard Groups
- Excess Loss Factor

SECTION 1

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# WC Background

# I WC Is Different

- ❖ Mandatory coverage
  - Indemnity (wage replacement)
    - Annuity-type benefits
  - Medical
    - Essentially unlimited medical coverage
- ❖ Exclusive remedy (no fault)
- ❖ No “Pain and Suffering”
- ❖ No Policy Limit
- ❖ Very little claim count development but potentially significant dollar development due to extremely long tail
- ❖ CAT exposed (industrial accident, terrorism and earthquake)

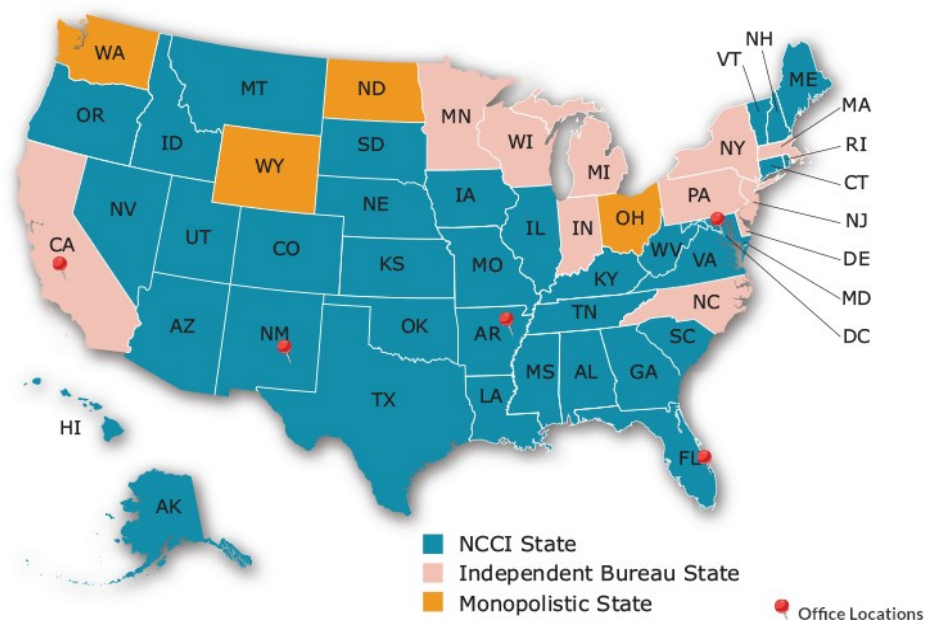
# | WC State Differences

- ❖ Monopolistic: ND, OH, WA, WY
- ❖ Special state reinsurance facility: MN (WCRA)
- ❖ Opt out state: TX
- ❖ Ability to settle severe claims
  - Indemnity only, Indemnity + Medical
- ❖ Indemnity benefit / medical payment defined by statute
- ❖ State economy
- ❖ Residual markets
- ❖ Pricing freedom / regulation

# | WC Rating Bureau Differences

## ❖ NCCI (in ~37 states) – more detailed data

- Unit Statistical Plan (USP)
- Annual Statistic Bulletin
- WorkComp Workstation
- Financial Data
- Indemnity / Medical Data
- Large Loss data / Proof of coverage data
- Annual Issue Symposium



State Map - Copyright of NCCI

## ❖ Independent rating bureau (in 11 states)

- Independent bureaus vary, but influenced by NCCI, vice versa



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## SECTION 2

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# Experience Rating

# I Premium On-leveling

- ❖ Premium on-leveling
  - Same technique as primary rate making
- ❖ WC is subject to benefit changes
- ❖ Occasionally, the benefit changes apply to outstanding claims as well as new claims
- ❖ Insurers may get mid-term rate changes to adjust for the impact of these changes (rare)
- ❖ Most of states will not have a significant benefit change in a given year
  - If you are pricing a treaty covering many states, you may be tempted to do a quick-and-dirty adjustment



## I Trend

- ❖ Trend should be appropriate for the kind of claims that get into the layer being priced
  - “Large loss” frequency and severity trends
  
- ❖ Ideally, severity trends should be applied to medical and indemnity amounts separately
  - Otherwise, combine medical and indemnity severity trend to get a combined severity trend
  - Generally, medical is a much larger portion of large claims
  - Fatal claims are rare, usually under \$1M, and typically heavily indemnity

## | Trend

- ❖ The long tail in WC makes measuring trend difficult. Calendar year effects are difficult to measure and separate.
- ❖ Submission claim reporting threshold should reflect trends
  - After trending, are you missing some claims?

# I How Should Trend to Be Applied

## ❖ Indemnity

- In most states, indemnity amount is fixed at time of loss and stays constant over time
  - So AY trend makes sense
- Some states adjust for cost of living (COLA)

## ❖ Medical

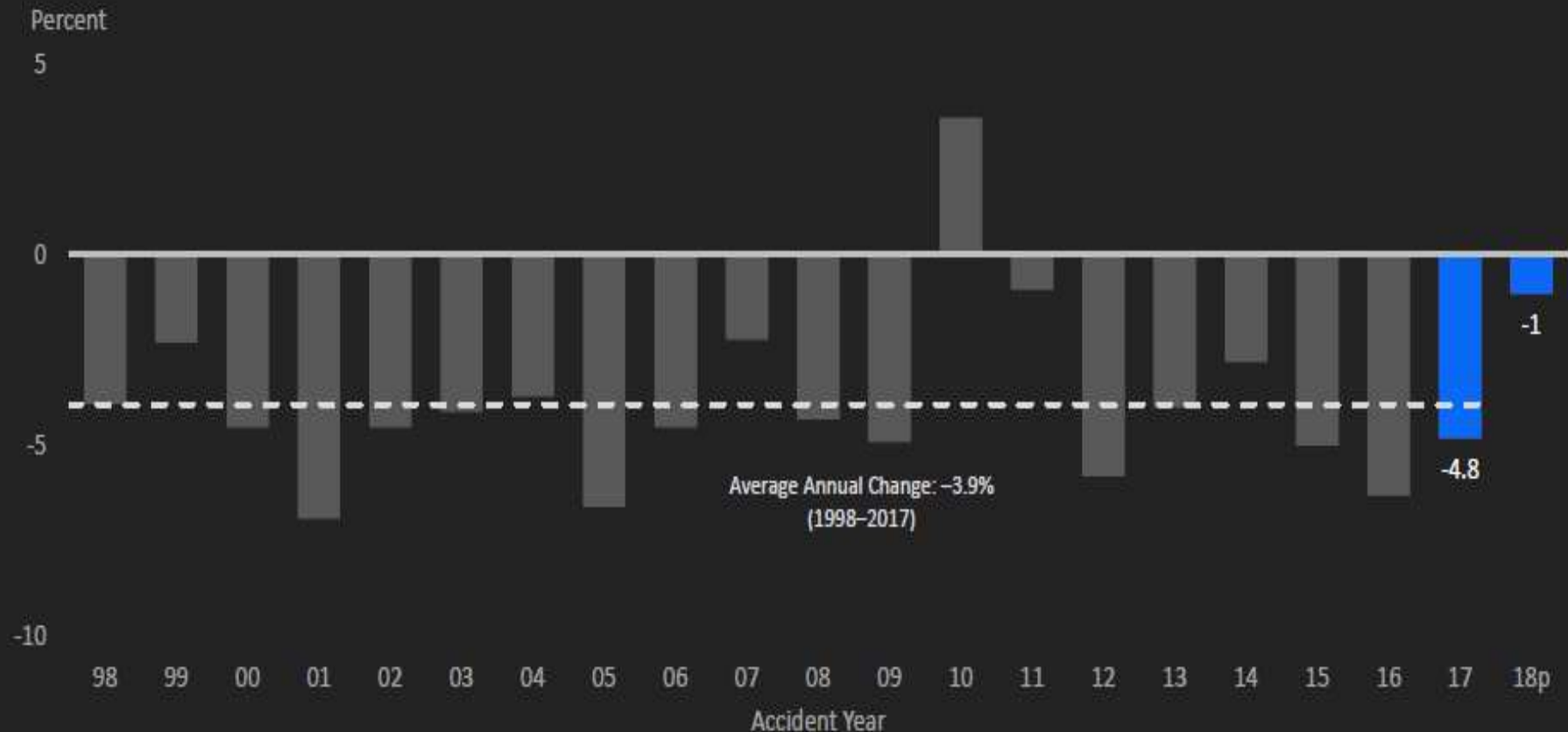
- Cost of medical varies by service year
- Usually just apply AY trend
  - Service year trend changes will show up as development

# I Frequency Trend

- ❖ Lost-time claims per exposure base (e.g. covered workers, covered payroll, on-leveled premium)
- ❖ Long term, frequency trend has been negative
- ❖ In the past, frequency trend varies by injury type
  - NCCI collects USP data by injury type: fatal, permanent total, permanent partial, temporary total and medical only
  - Frequency trend impacted by the shifting mix of injury types
  - Even the large loss trends show impact of the negative frequency trend
- ❖ Frequency trend will respond to law changes, economic conditions

# WC Lost-Time Claim Frequency

Change in Claims per \$1M Pure Premium, Private Carriers and State Funds—NCCI States



2010 and 2011 adjusted primarily for significant changes in audit activity

p Preliminary, based on data valued as of 12/31/2018

Source: NCCI's Financial Call data, developed to ultimate, premium adjusted to current wage and voluntary pure premium level, excludes high-deductible policies; based on data through 12/31/2017

Values displayed reflect the methodology underlying the most recent rate/loss cost filing

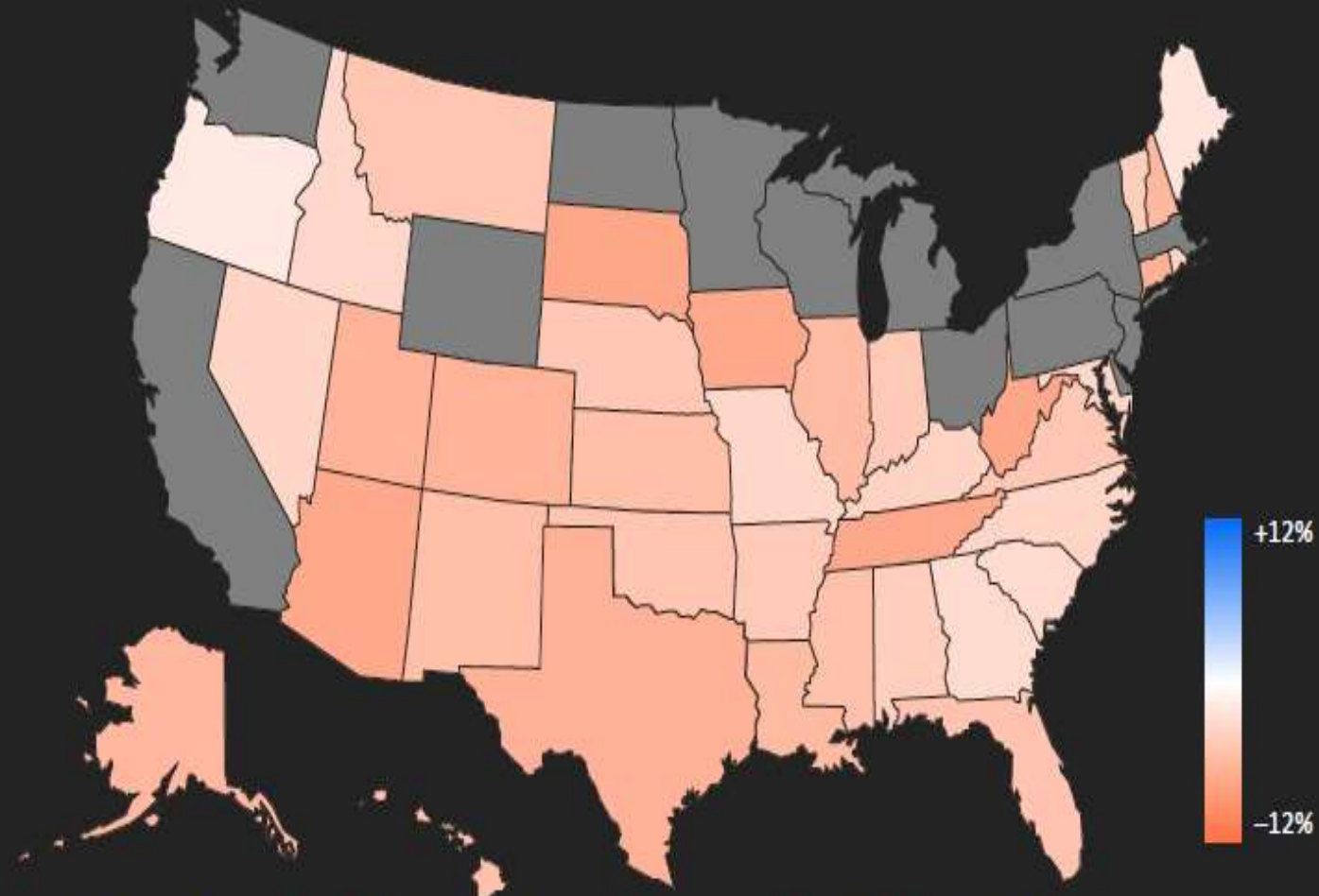
Includes all states where NCCI provides ratemaking services; NV is excluded through 2001, TX is excluded through 2006, and WV is excluded through 2011

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# WC Lost-Time Claim Frequency

Average Annual Change 2013–2017, Private Carriers and State Funds—NCCI States



Source: NCCI's Financial Call data, developed to ultimate, premium adjusted to current wage and voluntary pure premium level, excludes high-deductible policies; based on data through 12/31/2017

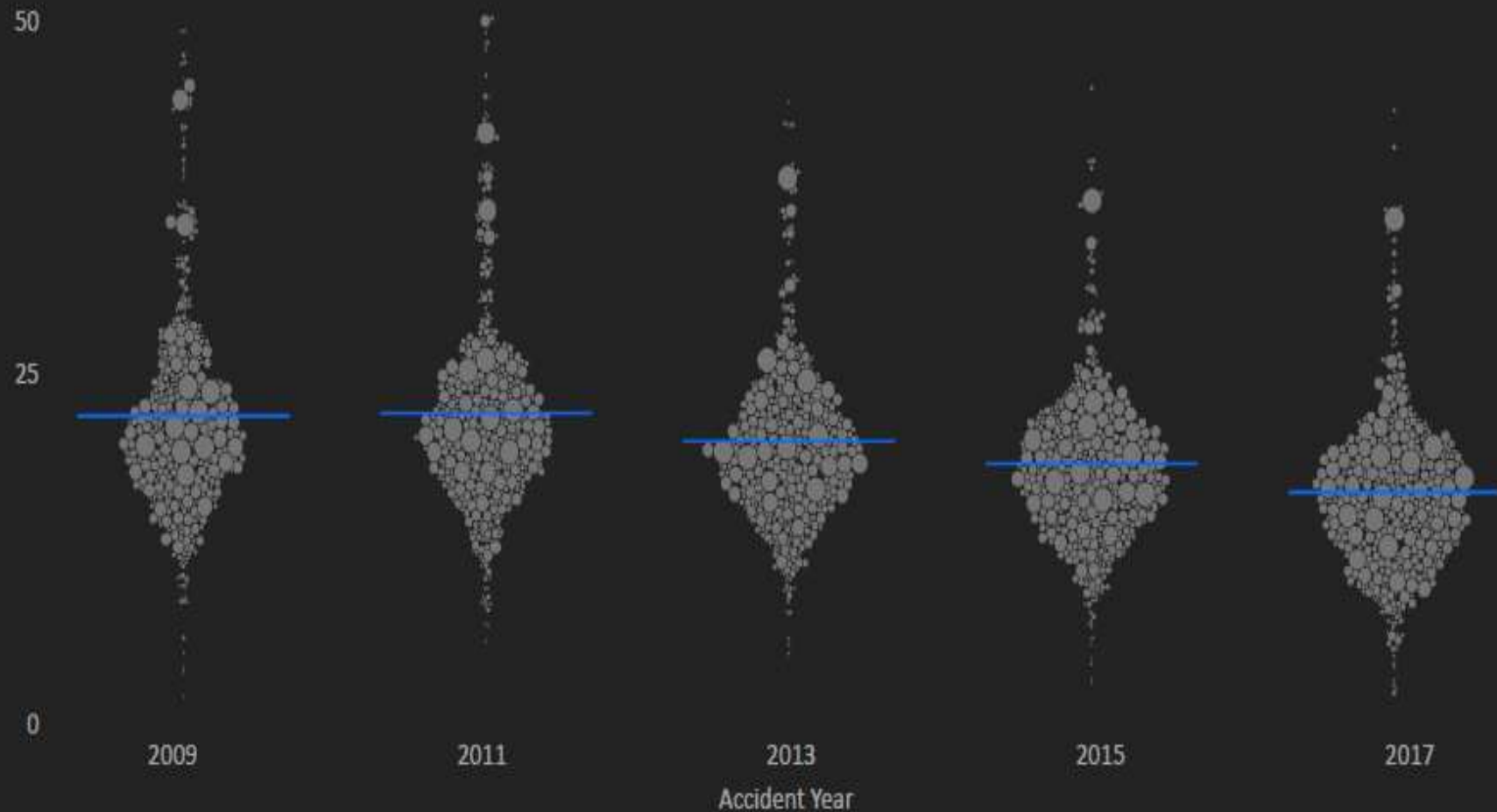
Values displayed reflect the methodology underlying the most recent rate/loss cost filing  
Includes all states where NCCI provides ratemaking services

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# WC Lost-Time Claim Frequency by Carrier Group

Claims per \$1M Pure Premium, Private Carriers and State Funds—NCCI States



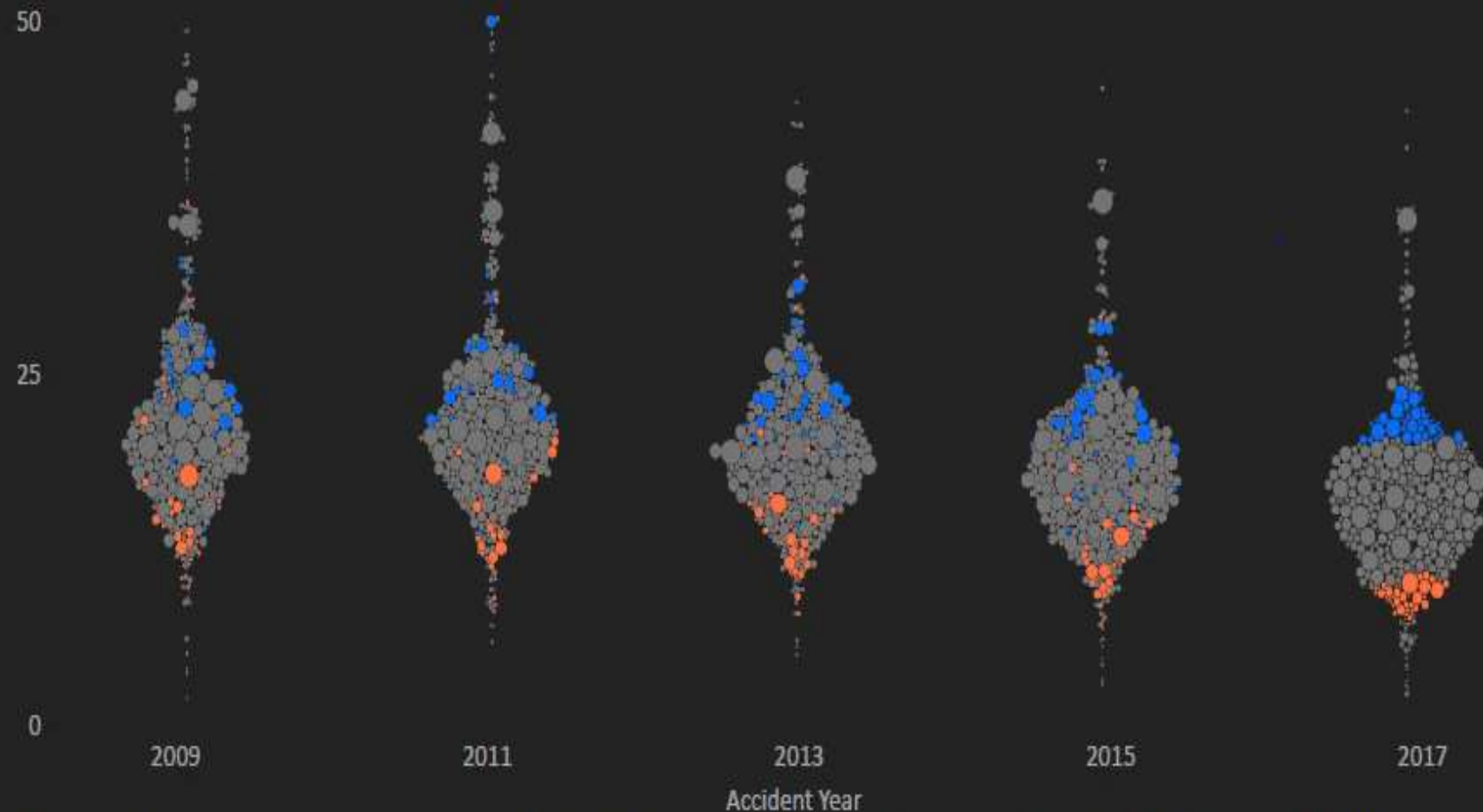
Source: NCCI's Financial Call data, developed to ultimate, premium adjusted to current wage and voluntary pure premium level, excludes high-deductible policies; based on data through 12/31/2017  
The size of the circle is based on the carrier group's premium volume up to \$300M

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# WC Lost-Time Claim Frequency—High and Low Carrier Groups

Claims per \$1M Pure Premium, Private Carriers and State Funds—NCCI States



Source: NCCI's Financial Call data, developed to ultimate, premium adjusted to current wage and voluntary pure premium level, excludes high-deductible policies; based on data through 12/31/2017

Carrier groups: High—between the 80th and 90th percentiles

Low—between the 10th and 20th percentiles

The size of the circle is based on the carrier group's premium volume up to \$300M

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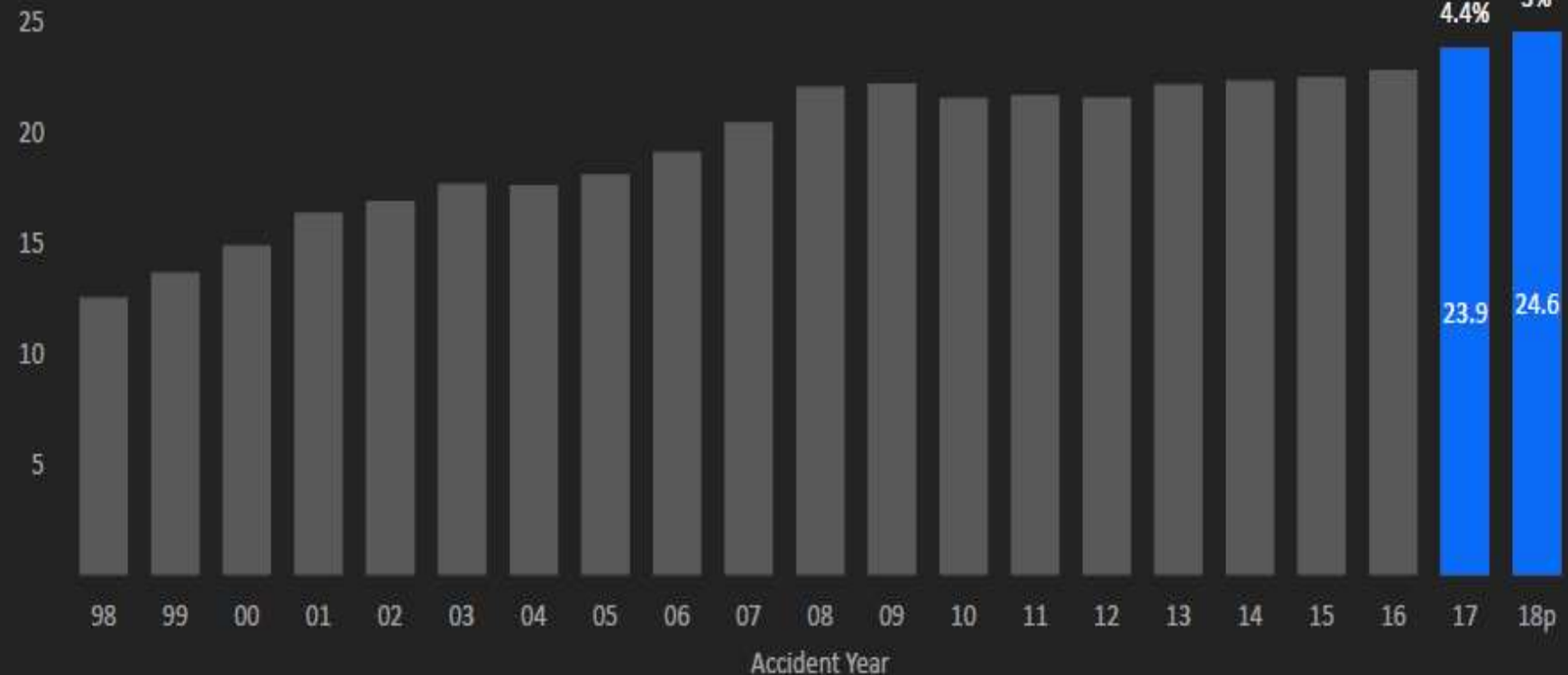
# I Indemnity Severity Trend

- ❖ Long term, indemnity severity is trending upward
  
- ❖ Indemnity severity “should” follow wage inflation, but growth can lag or exceed wage inflation
  - Few factors can influence duration of indemnity benefit
    - Law changes
    - Economy
    - Change in treatments (quicker return to work with outpatient options)
    - Min and max caps on indemnity

# WC Average Indemnity Claim Severity

Private Carriers and State Funds—NCCI States

Severity  
(\$ Thousands)



p Preliminary, based on data valued as of 12/31/2018

Source: NCCI's Financial Call data, developed to ultimate, excludes high-deductible policies; based on data through 12/31/2017

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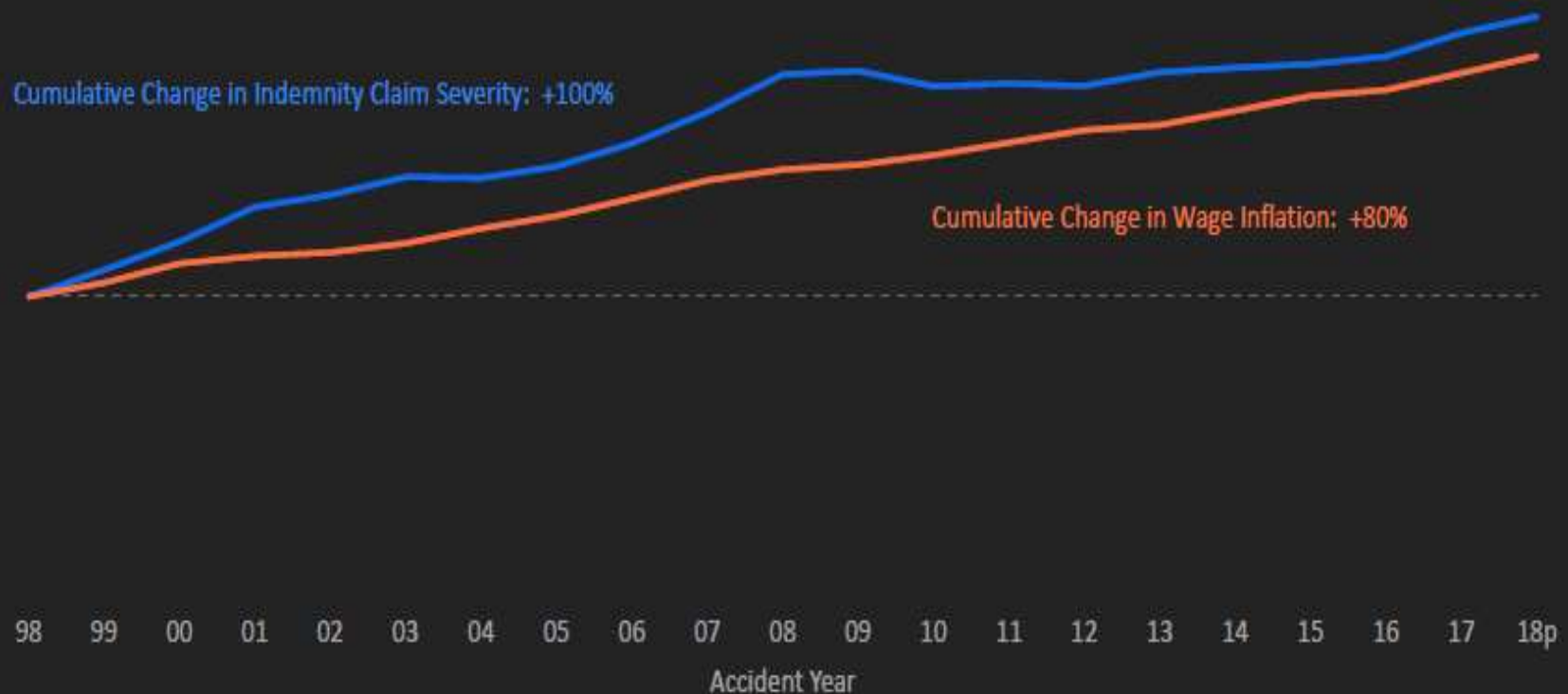
Includes all states where NCCI provides ratemaking services; WV is excluded prior to 2008; NV and TX are excluded prior to 2004

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# WC Average Indemnity Claim Severity

Private Carriers and State Funds—NCCI States



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US Average Weekly Wage: 1998–2007 and 2012–2017 Quarterly Census of Employment and Wages, US Bureau of Labor Statistics (BLS); 2008–2011 NCCI; 2018p NCCI and Moody's Analytics

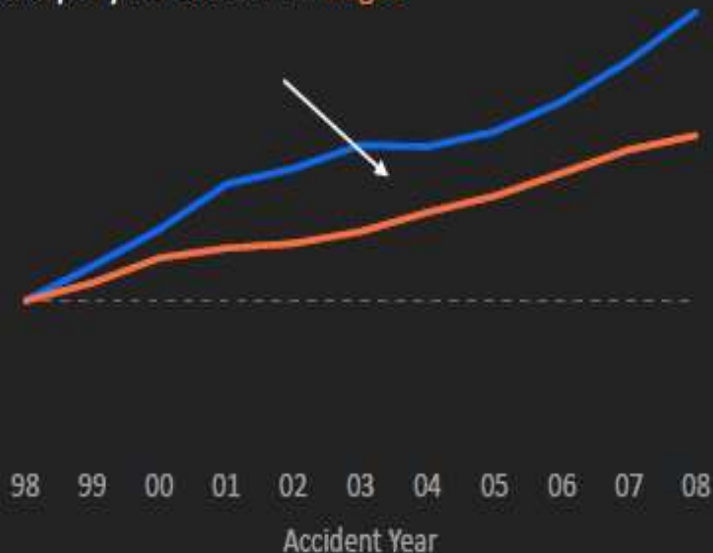
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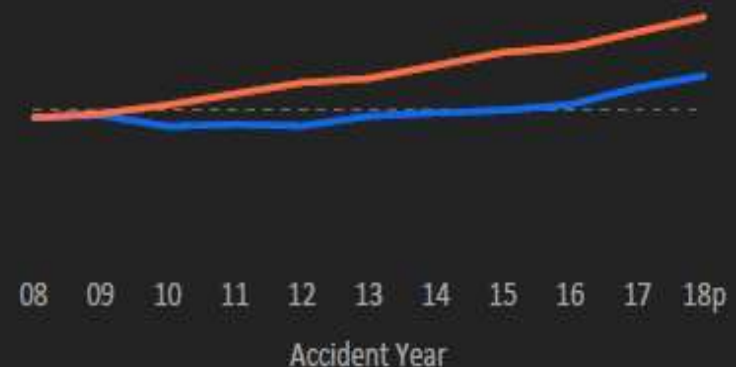
# Relative Growth Rates—Indemnity Severity vs. Wage Inflation

Private Carriers and State Funds—NCCI States

Indemnity claim severity grew  
2.3% per year faster than wages



Wage inflation outpaced changes  
in indemnity claim severity by  
1.2% per year, on average



p Preliminary, based on data valued as of 12/31/2018

Sources: Severity: NCCI's Financial Call data, developed to ultimate, excludes high-deductible policies; based on data through 12/31/2017

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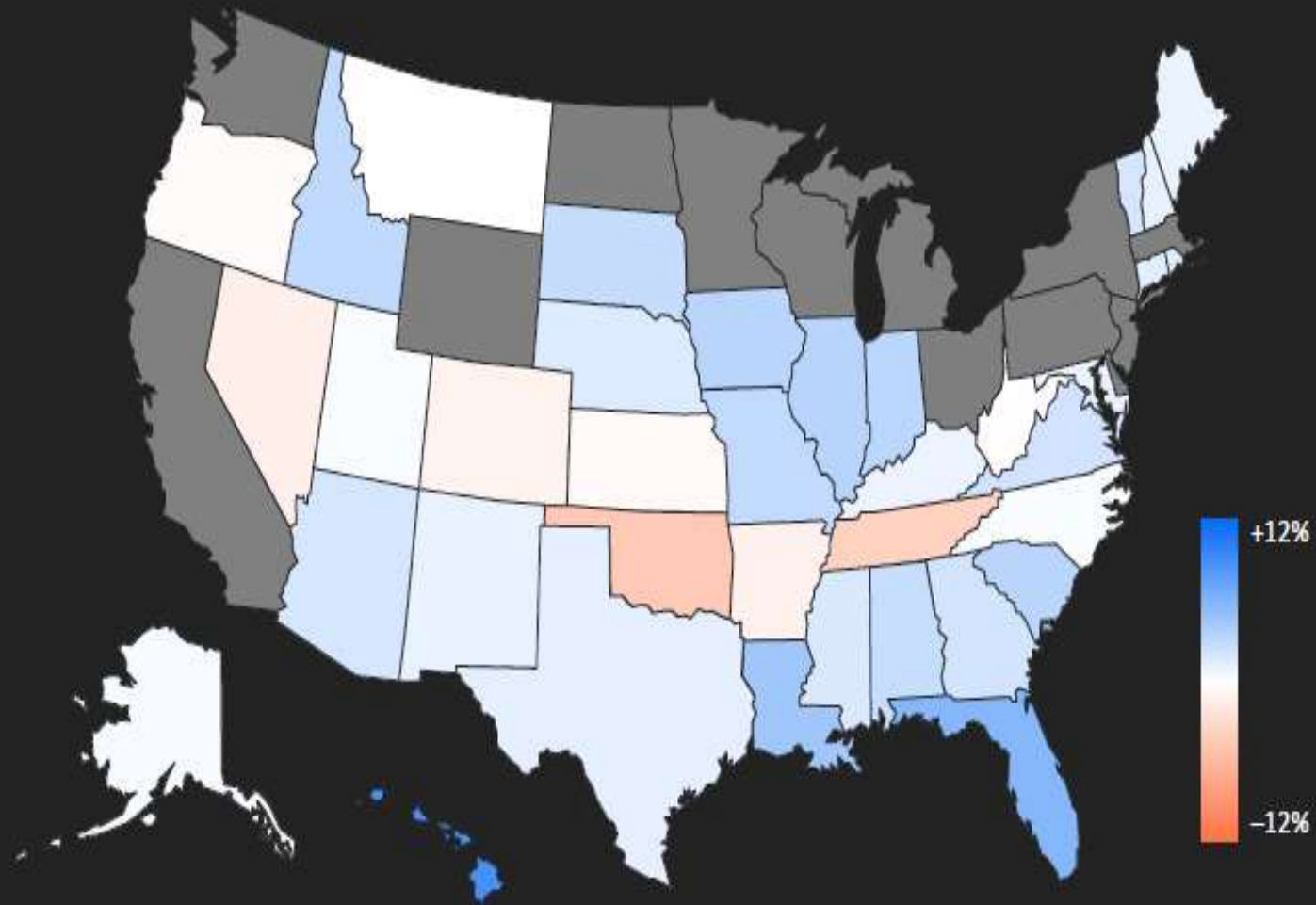
US Average Weekly Wage: 1998–2007 and 2012–2017 Quarterly Census of Employment and Wages, BLS; 2008–2011 NCCI; 2018p NCCI and Moody's Analytics

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# WC Average Indemnity Claim Severity

Average Annual Change 2013–2017, Private Carriers and State Funds—NCCI States



Source: NCCI's Financial Call data, developed to ultimate, excludes high-deductible policies; based on data through 12/31/2017  
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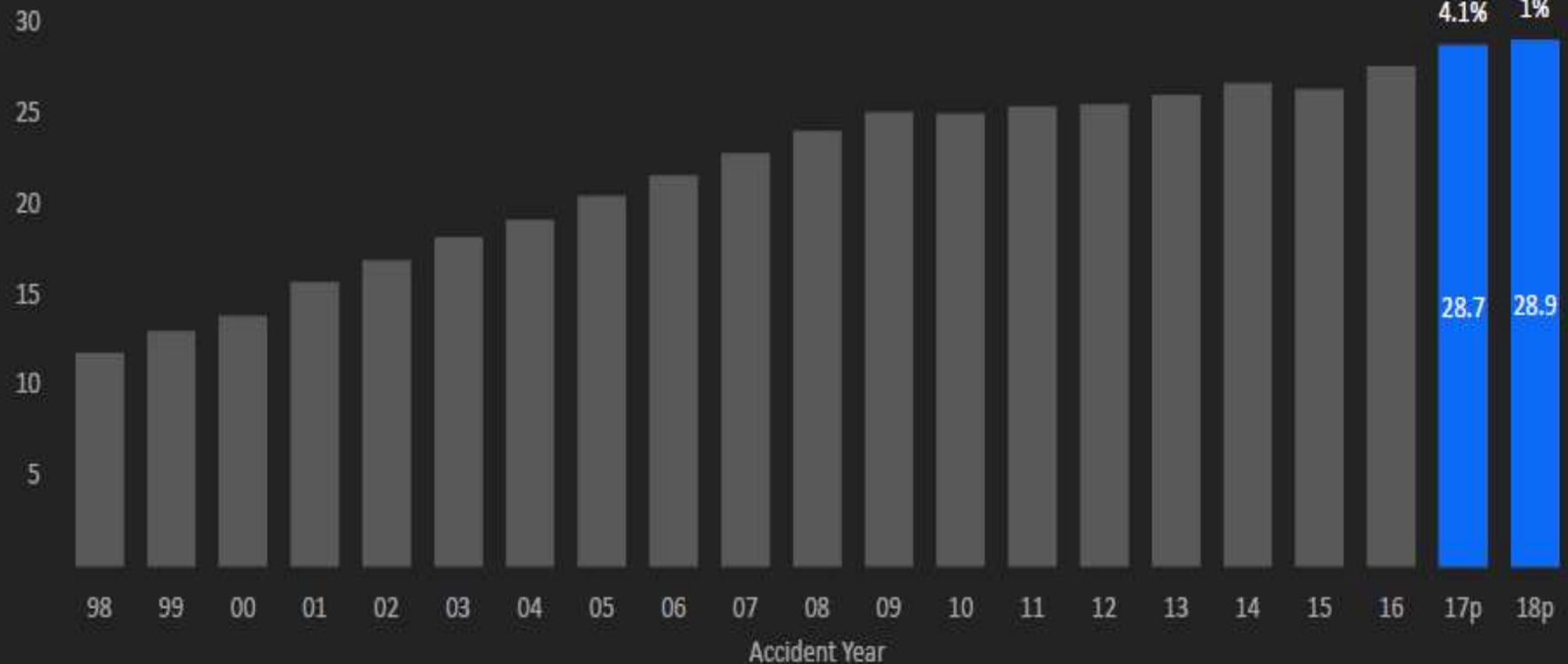
# I Medical Severity Trend

- ❖ WC medical benefit growth has been high
- ❖ Attempts to control growth by states
  - Managed care
  - Provider networks
  - Choice of physician
  - Hospital cost containment
  - Drug formularies
  - Opioid alternatives
- ❖ NCCI medical data call provides more insights
  - Current report on medical services by claims size and maturity

# WC Average Medical Lost-Time Claim Severity

Private Carriers and State Funds—NCCI States

Severity  
(\$ Thousands)



p Preliminary, based on data valued as of 12/31/2018

Source: NCCI's Financial Call data, developed to ultimate, excludes high-deductible policies; based on data through 12/31/2017

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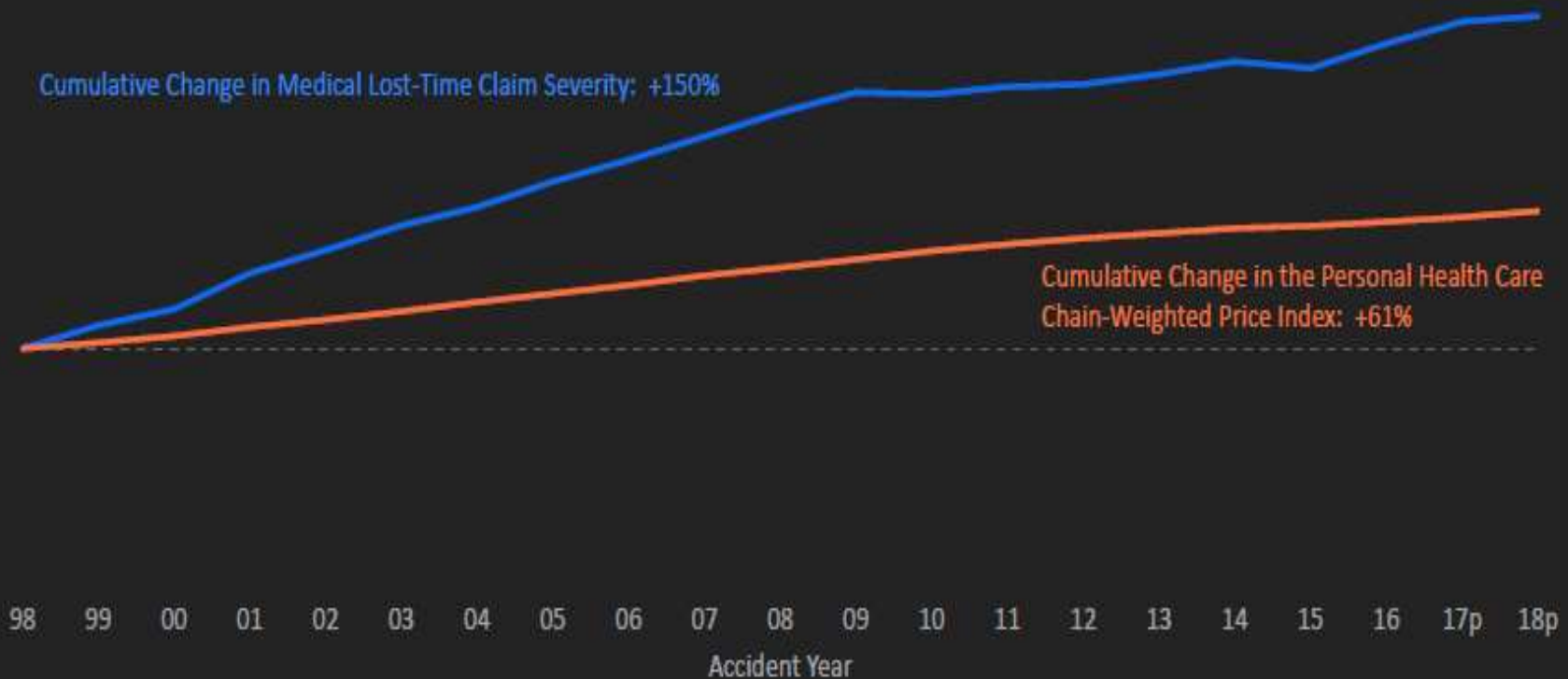
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Private Carriers and State Funds—NCCI States



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PHC Chain-Weighted Price Index: Centers for Medicare & Medicaid Services

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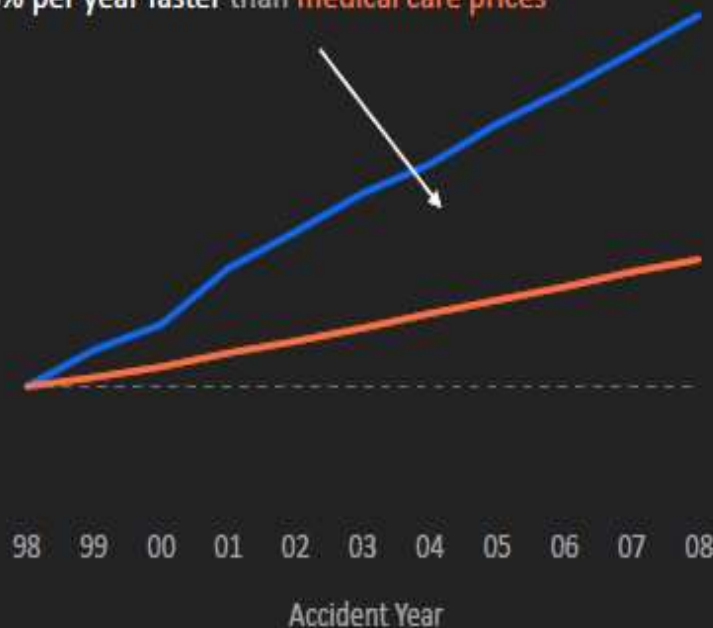
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# Relative Growth Rates—Medical Severity vs. Price Inflation

Private Carriers and State Funds—NCCI States

Medical lost-time claim severity grew  
4.3% per year faster than medical care prices



Changes in medical lost-time claim severity  
and medical care prices tracked one another



p Preliminary, based on data valued as of 12/31/2018

Sources: Severity: NCCI's Financial Call data, developed to ultimate, excludes high-deductible policies; based on data through 12/31/2017

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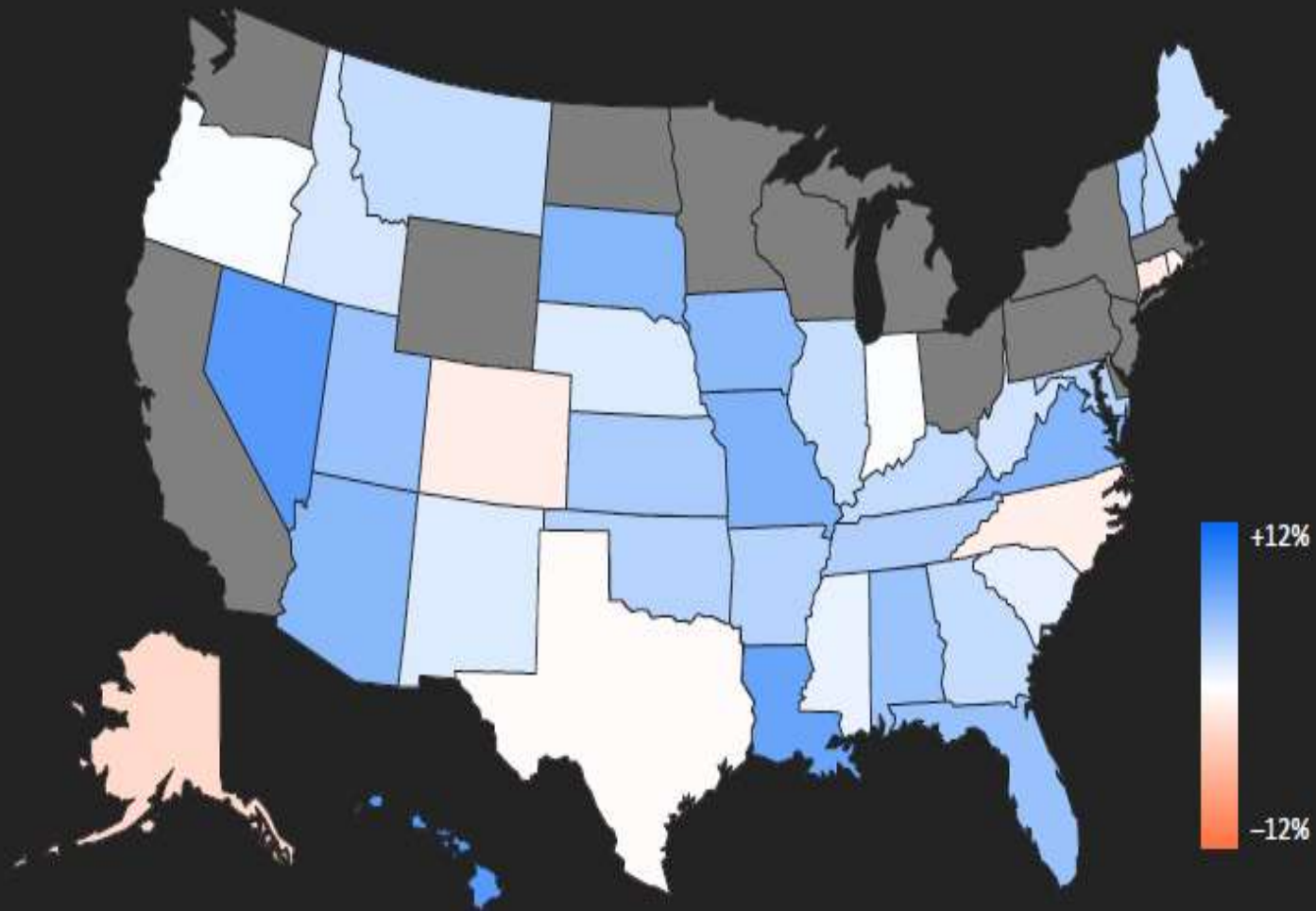
PHC Chain-Weighted Price Index: Centers for Medicare & Medicaid Services

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# I Large Loss Development Factors

## ❖ Why WC has long tail

- Future life expectancy assumptions used to set up case reserve
- Typically no medical inflation built in case reserve
- Adverse development can happen quite late
  - Long term care cost is higher than family care
  - Existing injuries deteriorate at older age
  - Additional damage can result from original injury (e.g. knee injury resulting from original back injury)

# I Large Loss Development Factors

## ❖ Example of impact on reinsurer

- Life expectancy of injured worker is 10 years
- Weekly indemnity benefits are 500/week = 26,000/year
- Initial stabilizing medical expenses are 150,000
- Ongoing annual medical expenses are 50,000/year
- 6% of annual inflation for medical benefit
- Reinsurer layer is 1M x 1M

# | Large Loss Development Factors

## ❖ Inflation assumption impact

	<u>0% inflation</u> for ongoing medical expenses	<u>6% inflation</u> for ongoing medical expenses
Indemnity benefit	260K = 26,000 * 10	260K
Initial medical expenses	150K	150K
Ongoing medical expenses	500K = 50,000 * 10	659K = 50,000 * (1.06 <sup>10</sup> - 1) / 0.06
Total case reserve	910K	1,069K
<b>1M x 1M layer</b>	<b>0</b>	<b>69K</b>

# I Large Loss Development Factors



## ❖ Life expectancy assumption impact

Discount rate = 6%

Time	Probability of making payment	Payment	Primary Payment	Reinsurer Payment XS of \$1M	Discounted Primary Payment	Discounted Reinsurer Payment XS of \$1M
0	100%	50,000	50,000	-	50,000	-
1	95%	53,000	53,000	-	50,000	-
2	90%	56,000	56,000	-	49,840	-
3	86%	59,000	59,000	-	49,538	-
4	81%	63,000	63,000	-	49,902	-
5	77%	67,000	67,000	-	50,066	-
6	74%	71,000	71,000	-	50,052	-
7	70%	75,000	75,000	-	49,879	-
8	66%	80,000	80,000	-	50,193	-
9	63%	85,000	85,000	-	50,311	-
10	47%	90,000	90,000	-	50,256	-
11	35%	95,000	95,000	-	50,045	-
12	27%	101,000	101,000	-	50,194	-
13	20%	107,000	55,000	52,000	25,786	24,380
14	15%	113,000	-	113,000	-	49,980
15	11%	120,000	-	120,000	-	50,072
16	8%	127,000	-	127,000	-	49,993
17	6%	135,000	-	135,000	-	50,134
18	5%	143,000	-	143,000	-	50,099
19	4%	152,000	-	152,000	-	50,238
20	3%	161,000	-	161,000	-	50,201
21	0%	171,000	-	171,000	-	50,301
Expected		706,190	629,320	76,870	460,553	30,909

# I Large Loss Development Factors

## ❖ Other considerations

- Discounting (explicit / implicit discounting) could have larger impact on an excess layer
- Default LDF selections (company specific vs industry)
- Reported case reserves
  - Case reserves set up by the insurer
- Additional case reserves
  - Additional case reserves set up by reinsurer
  - Example:
    - Paid = 500K, O/S = 500K (RCR)
    - Reinsurer layer is 500K x 500K and 1M x 1M
    - ACR might be -100K for 500K x 500k (fatality probability)
    - ACR might be 100K for 1M x 1M (longevity)

# I Large Loss Benefit Level Changes

## ❖ Most benefit changes are small

- Increase in maximum weekly benefit
- Change in burial allowance

## ❖ Large changes do occur, its impact can vary by injury types

- California SB863 PD benefit change impact on January 1, 2014 is 3.1%, in addition to claim frequency impact on January 1, 2013 of -5.8%
- Pennsylvania Protz IRE decision change impact on November 1, 2017 is 13.37% on indemnity benefit loss cost, and 6.06% overall





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## SECTION 3

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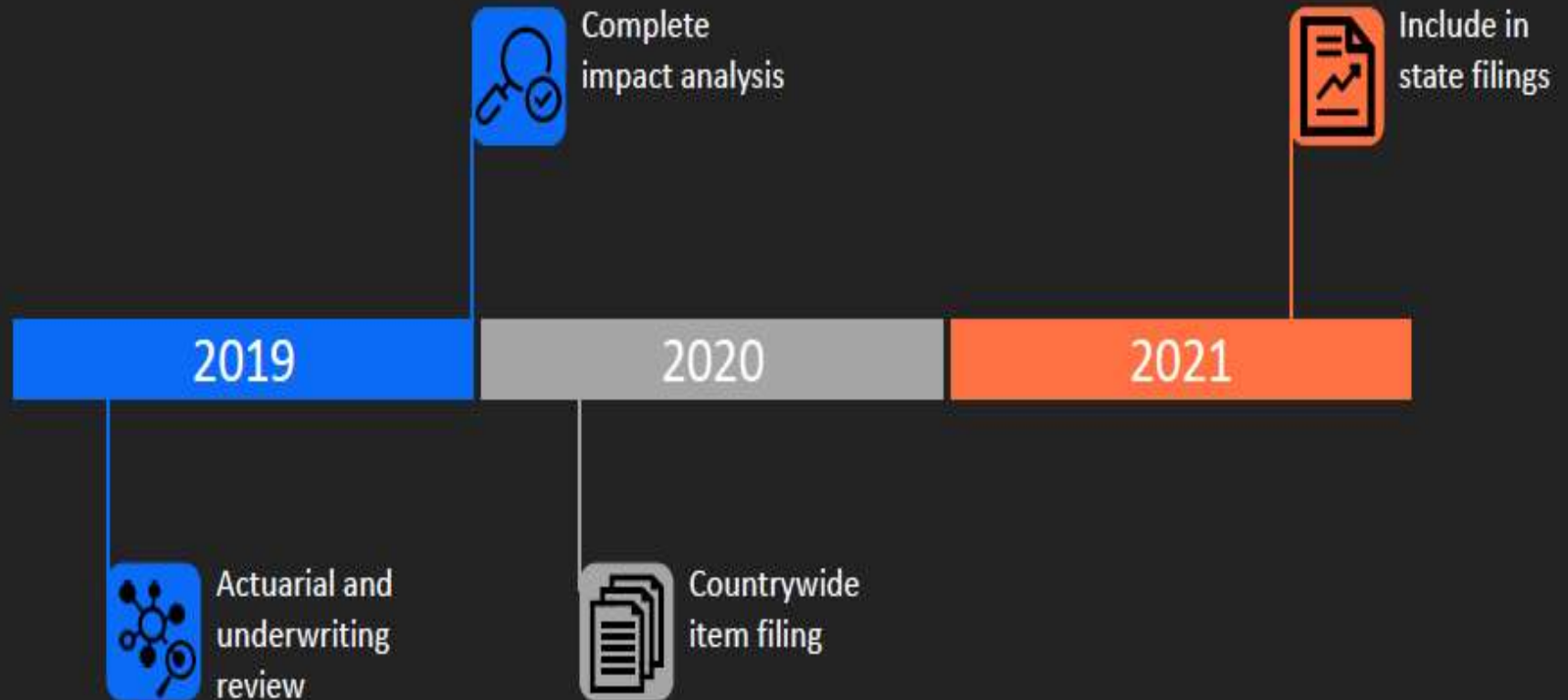
# Exposure Rating

# | Hazard Groups

- ❖ Groups are created by NCCI, and adopted by other rating bureau
- ❖ Class mapping to HG can vary by states
- ❖ Hazard groups ranged from A-G or (1-7), where A(1) is least severe, and G(7) is the most severe
- ❖ NCCI is updating HG

# Hazard Group Update

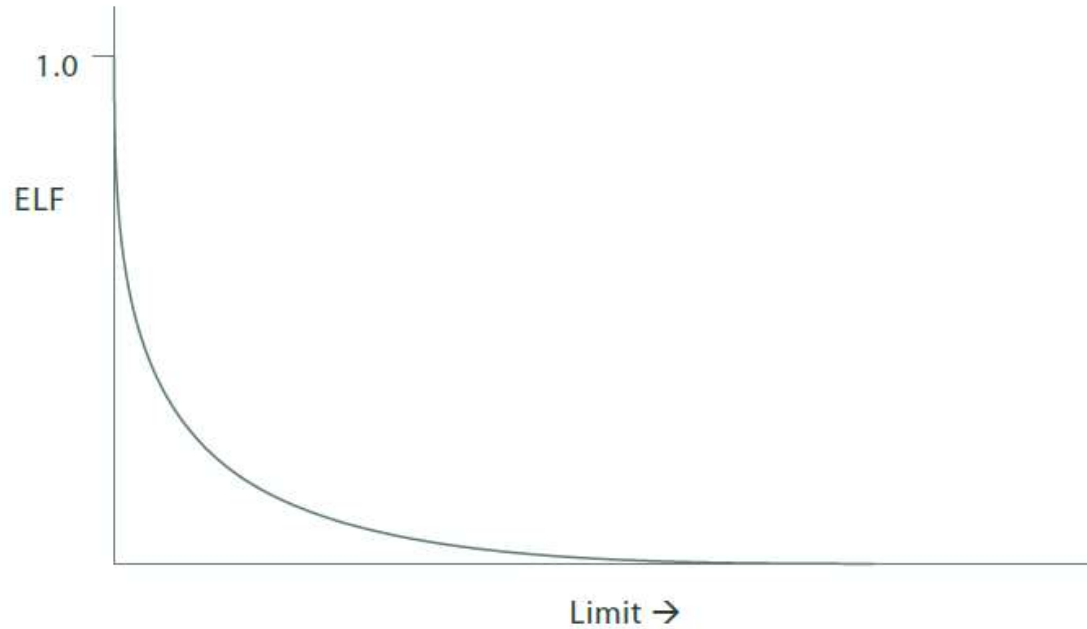
## Planned Implementation Timeline



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# | Excess Loss Factor

- ❖ ELF represents the expected amount of losses above a given limit (excess losses) relative to total losses( or loss and ALAE, or premium)
- ❖ ELF of a given limit varies by state and by HG
- ❖ ELF curve



## | Excess Loss Factor

### ❖ Subtract ELPPFs to estimate layer losses – example

- Assume you have ELPPFs that you are happy with
- Suppose we're pricing the \$1M x \$1M layer
- Expected Loss Ratio = 75%
- $ELPPF(1M) = 0.13$ ;  $ELPPF(2M) = 0.06$
- Losses in the layer =  $ELPPF(1M) - ELPPF(2M) = 7.0\%$
- 7.0% of the total losses are in this 1M x 1M layer
- Exposure Loss Cost Rate =  $75\% * 7.0\% = 5.25\%$
- This still needs to be discounted and loaded



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# Q&A

# | Acknowledgement

- ❖ This presentation is an adaption of a presentation originally created by Chris Svendsgaard