



Pricing without a Safety Net

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- Some thoughts on innovation
- Guiding principles
- Real life pricing examples
 - Property
 - PTSD Presumption
 - Prejudgment Interest Legislation
 - Cyber Liability
 - Sexual Abuse and Molestation
- Conclusion





Some thoughts on innovation

- <https://www.youtube.com/watch?v=Uis4EanV15o>



Guiding principles





A rate is an estimate of the expected value of future costs

Considerations that may apply:

Exposures

External factors

Trends

Loss data

Operational changes

Risk margin

Policy provisions

Reinsurance

Actuarial judgement





Some Reference Materials

ASOP No. 9
Documentation and
Disclosure in P/C Insurance
Ratemaking, Loss
Reserving, and Valuations

ASOP No. 23
Data Quality

ASOP No. 25
Credibility Procedures

ASOP No. 38
Using Models Outside the
Actuary's Area of Expertise
(P/C)

ASOP No. 41
Actuarial Communications

ASOP No. 53
Estimating Future Costs for
Prospective P/C Risk
Transfer and Risk Retention

ASOP No. 56
Modeling



Example #1: Pricing property risks





Impacting Factors

- A worldwide chemical manufacturer's property insurance program changed suddenly after years of stability

Pain Points

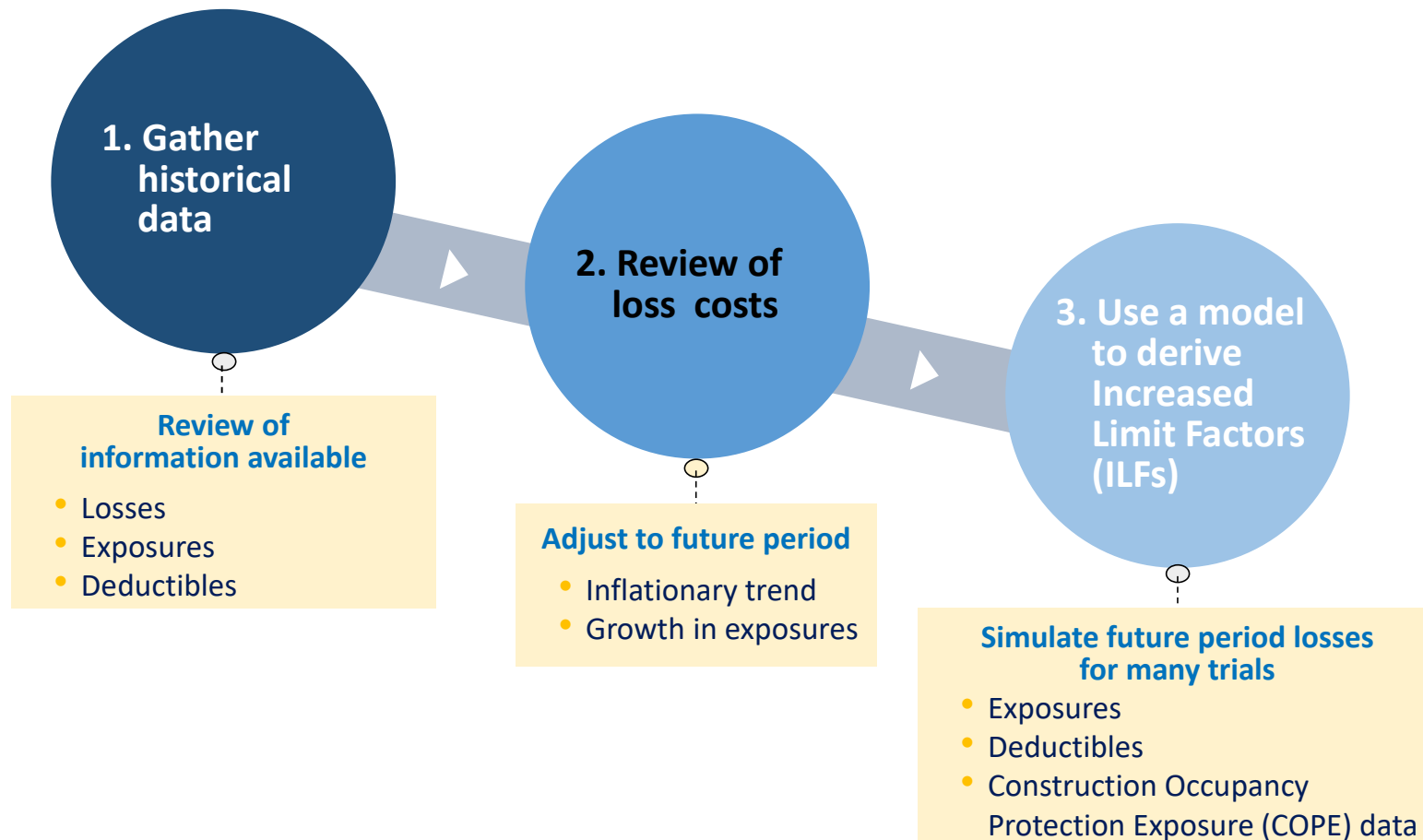
- Forced to substantially increase deductibles by location

Data Limitations

- Historical claims under the deductibles were paid as received locally so ground up loss history was incomplete
- Historical exposure data by location was limited (only current year detail available)



Steps of an analysis



Data provided



A listing of claims with their associated ground up paid and reported loss and ALAE amount and claim status



Historical and projected exposures, including Construction Occupancy Protection Exposure (COPE) data



A summary of historical and current program structure



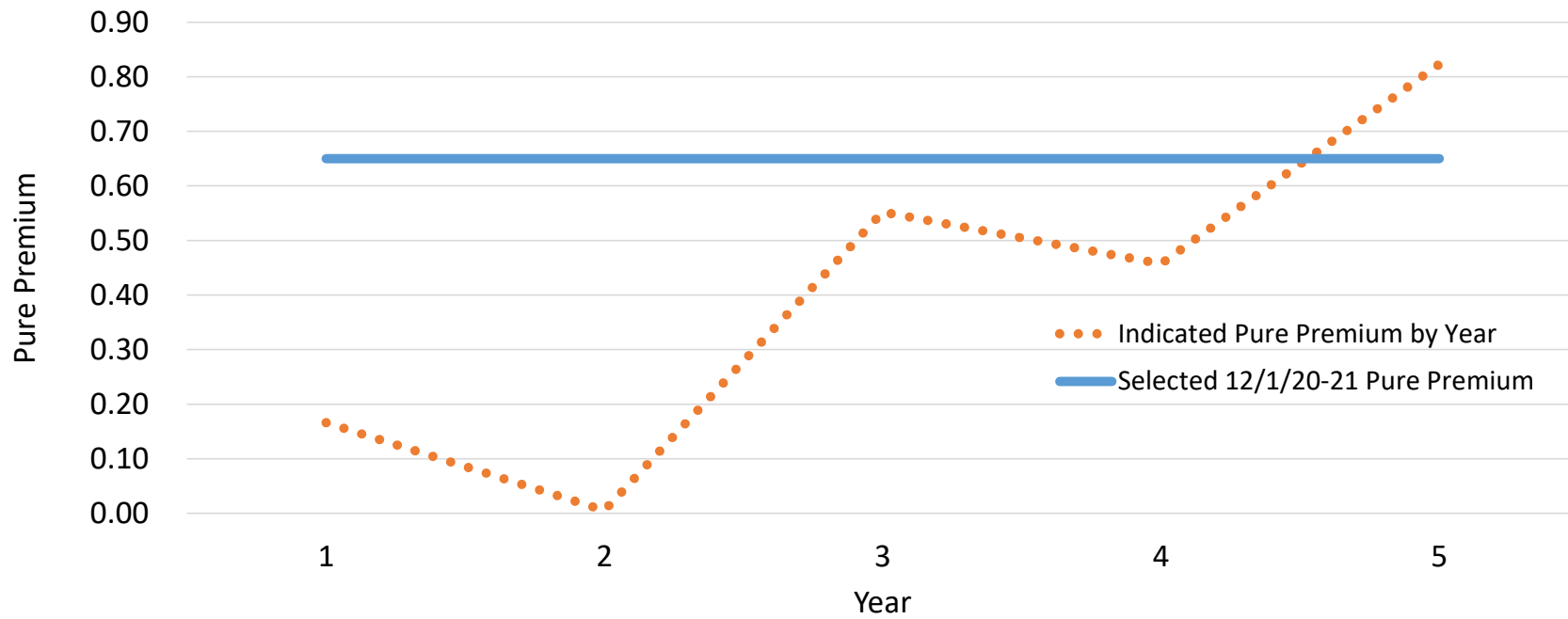
The locations faced substantial increases in their deductibles

Location	Exposures (\$B's)	Average Expiring Deductibles	Average Renewal Deductibles	% Change
Location A	395	745,833	1,625,000	120%
Location B	10	250,000	2,500,000	900%
Location C	60	700,000	1,250,000	80%
Location D	340	967,000	2,818,000	190%
Location E	2,250	1,080,000	3,896,000	260%
Total/Average	3,055	1,013,000	3,426,000	240%



Costs were increasing significantly

Review of Historical Years - Loss Cost at \$1M Limits



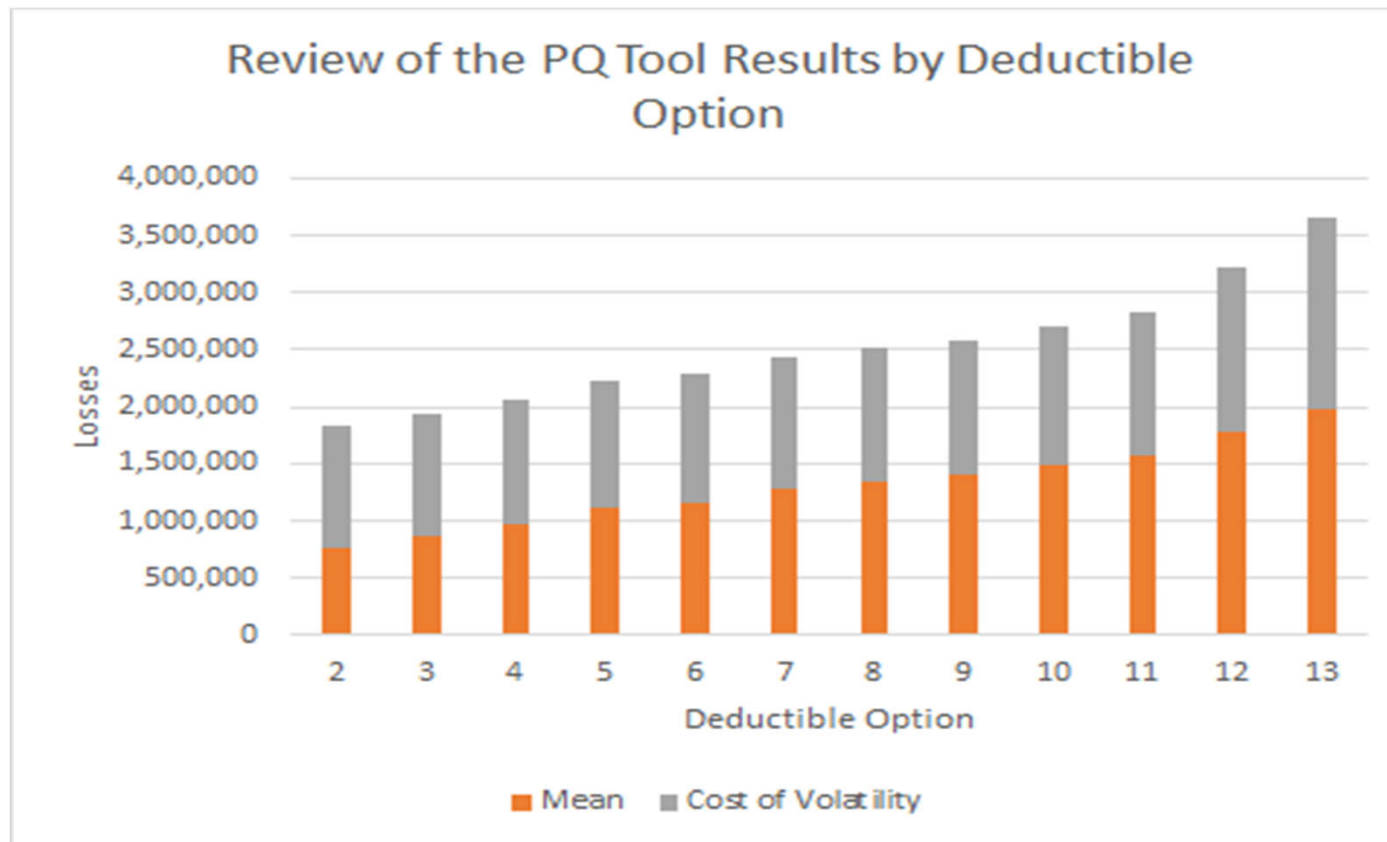


The solution

- Expected losses by location/deductibles by using a model
 - Platform models natural perils and all other loss types to quantify a global property program
 - Uses statements of values, loss runs (if available) and engineering reports
 - Output is stochastic model of catastrophe and non-catastrophe risk
- Results by deductibles used to derive ILFs
- Determined retained captive losses by location



Results by deductible built ILFs





An example of the calculation

- Location A
 - Insured value \$1.5B
 - Insured-wide pure premium = \$0.65
 - \$1M limit losses = \$1.0M
 - ILF to expiring deductible is 1.50
 - ILF to new deductible is 2.0
 - Additional limit losses are \$0.5M or \$1.0M x (ILF difference)

The **additional limit losses** for all locations were funded in the captive



Example #2: PTSD presumption



Impacting Factors

- PTSD is a growing exposure in the public sector and can be embedded in workers compensation

Pain Points

- At least 20% of first responders likely to be diagnosed with PTSD
- A generation of veterans now fills the ranks of first responders

Data Limitations

- Lack of historical PTSD presumption data

Solution

- An insurance product outside of workers compensation to address PTSD costs



PTSD National Statistics

Millions struggle with PTSD

- **70%** of adults (~ **223.4** million people) in the U.S. have experienced some type of traumatic event at least once in their lives.
- Up to **20%** (or ~**44.7** million people currently) go on to develop and struggle with PTSD.
- An estimated **8%** of Americans – **24.4** million people – have PTSD at any given time, close to the population of Texas.
- An estimated one out of every nine women develops PTSD, making them about twice as likely as men.

Females and military are more likely to be diagnosed

PTSD's cost to society is significant

- In the past few years alone the number of reported and diagnosed cases in the military jumped **50%**.
- The annual cost to society of anxiety disorders is estimated to be significantly over **\$42.3** billion, often due to misdiagnosis and under-treatment. This includes psychiatric and non-psychiatric medical treatment costs, indirect workplace costs, mortality costs, and prescription drug costs.
- According to the VA, experts estimate that up to **20%** of Operation Enduring Freedom and Operation Iraqi Freedom veterans, up to **10%** of Gulf War veterans, and up to **30%** of Vietnam War veterans have experienced PTSD. Consequently, demand for PTSD treatment continues to grow.

Demand for PTSD treatment continues to grow



Pain point Example: Minnesota – PTSD presumption enacted January 2019

Minnesota created a PTSD presumption for first responders that's expanded broadly to other positions (such as state correctional officers)

- Traumatic Events
- Basis to Rebut
- Initial Fiscal Impact
 - Range of estimated cost from \$27 million to \$52 million annually

MPR News article on October 6, 2021 summarizes the impact on Minneapolis police workers compensation claims

- WC spending in the City increased to \$14M in 2020; twice as large as previous years
- Police officers accounting for most of the claims
 - Driving frequency to the highest level in a decade
- PTSD claims now account for a substantial portion of the City's WC claims
 - 189 filed between March 2020 and September 2021
 - Almost half of the employees filing have served for more than 20 years





A Potential Solution is to Create a Separate Product to Cover PTSD

- Coverage requires a diagnosis from a psychologist or psychiatrist
 - Long Term Disability Benefit
 - To cover some portion of pre-disability annual earnings
 - Critical Illness Benefit
 - Provides a lump sum for medical costs not covered by current health insurance (i.e., large deductible plans)



Assumptions to derive premium depend on the plan design

Long Term Disability Benefit

- Plan Design
 - Benefit Trigger
 - Earnings Definition
- Benefit Structure
 - Benefit Percentage
 - Maximum monthly benefit
 - Benefit duration
- Contract Features
 - Pre-Existing Condition Limits
 - Definition of Disability
 - Elimination Period
- Incidence of PTSD

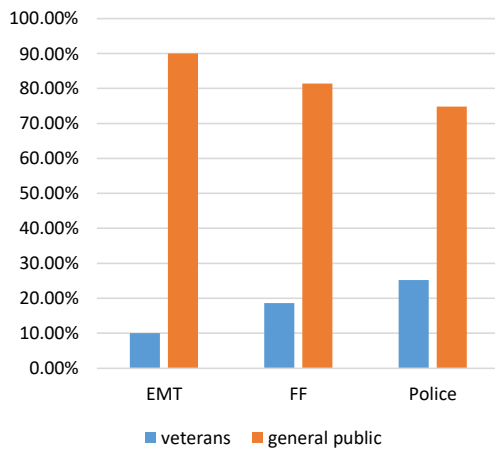
Critical Illness Benefit

- Plan Design
 - Benefit Trigger
 - Principal Benefit
 - Pre-Existing Condition
 - Waiting Period
- Covered Conditions
- Secondary Benefits
- Incidence of PTSD

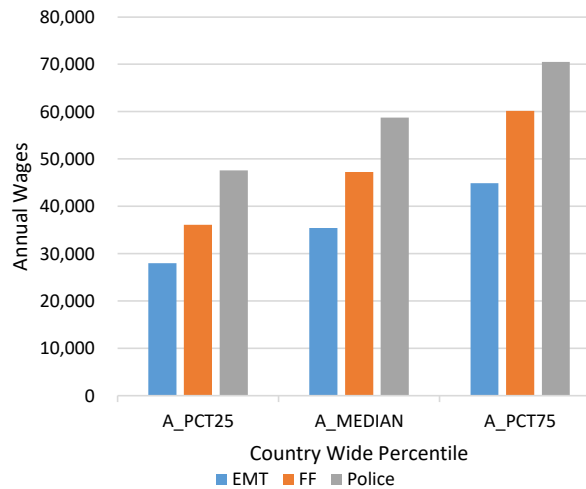


The loss cost integrates industry data with the coverage parameters

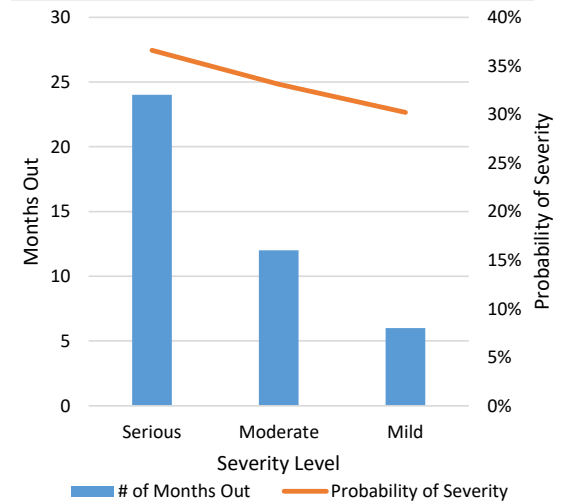
Percentage of First Responders by Status



Wages by First Responder



Determining Average Time Out





Assumptions are tailored to the first responder type

- Example:
 - State: NY
 - First responder type: Police
 - Percentage PTSD in a Year: average level
 - Average time out over elimination period: 1 Year
 - Average state wages: \$75,000
 - Add variable expenses for the policy
 - Annual PTSD Policy Rate: ~\$3,000



Another example of Presumption – COVID-19

Status of COVID-19 presumption in the U.S.

- Multiple states have enacted some form of presumption
- Most of these apply only to first responders and healthcare workers, while others list other specific occupations or apply to “essential employees”
- Several states have failed presumption legislation



Cost of impact of WC presumption

Uncertain and influenced by many factors, such as:

- Age distribution of employees
- Infection rate of state and demographics (i.e., rural, suburban, or urban...)
- Average annual wages



Models attempt to capture the uncertainty

- Assumptions include high vs. low mortality rate, high vs. low spread rate
- Compounding effects on models to quantify the range of expected losses
- Assumptions and factors interact with each other



Longer term impact

- Could WC presumption leak to other diseases or causes of loss (contagion effect)?
- Is there a potential for latency?



Example #3: Pricing Prejudgment Interest (PJI) Legislation





Impacting Factors

- New PJI legislation in IL was effective 7/1/2021
- PJI would begin to accrue at a 6% annual rate from date the action is filed
 - Not applicable during the period of voluntary dismissals
- A settlement offer provision does not allow accrual of interest on any part of a judgment at least as high as an offer made within 12 months of the filing date

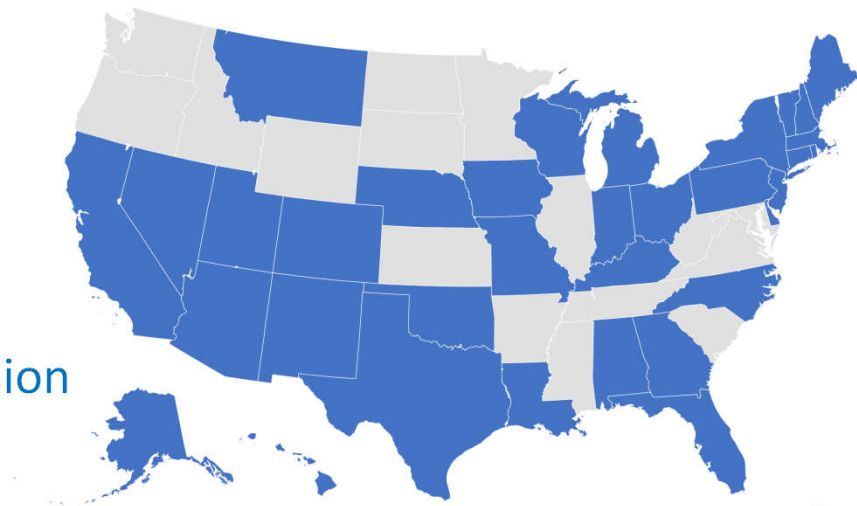
Pain Points

- Increased uncertainty with respect to how plaintiff attorneys and defense attorneys will react and adapt under the new law
- The impact of the threat of pre-judgment interest on case settlements is difficult to ascertain



Other states have PJI bills

- More than 65% of states have some form of PJI
- For most states, PJI has been in place for 15+ years
 - Limits the ability to analyze before/after effect of PJI on medical malpractice costs
- Interest rates vary
 - Fed rate plus 1% to 5% = 15 states
 - 5% to 9% = 7 states
 - 10%+ = 10 states
 - Discretionary = 2 states
- At least 7 states have a similar provision as Illinois for PJI applying only to judgment excess of settlement offer



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■ PJI

Based on information from White and Williams LLP and Cozen O'Connor (January 2015)



Background statistics on analysis data

Data Used

- IL closed claims data from last 15 years
 - Thousands of claims and billions of dollars

Input from claims staff

- Surveyed HC systems on how bill provisions bill would work



The historical claim distribution gave insights into potential frequency increases

- Potential for greater claim payouts as a result of prejudgment interest on claim amounts may result in increased propensity to bring a claim
- Assume that claims with merit are already being asserted
- At this point, expect minimal overall cost impact of higher frequency

While low severity claims represent a large majority of claims, they represent under a fifth of hospital professional liability cost.



We assumed that the average duration of claims will shorten by one year

As a result of PJI:

Percentage of cases going to trial/verdict:

Plaintiff attorneys will have more financial motivation to take cases to trial/verdict than in the past

Defendants will have more financial motivation to keep cases from going to trial/verdict than historically

We assumed these competing forces will offset, with no change to the historical rate of cases going to trial/verdict

Duration of claims:

Plaintiff attorneys will want to extend the duration of claims

Defendants will want to shorten the duration of claims

We assumed that the average duration of claims will shorten slightly

The closer a claim gets to trial, the greater proportion of PJI the defense will have to consider in their settlement values.

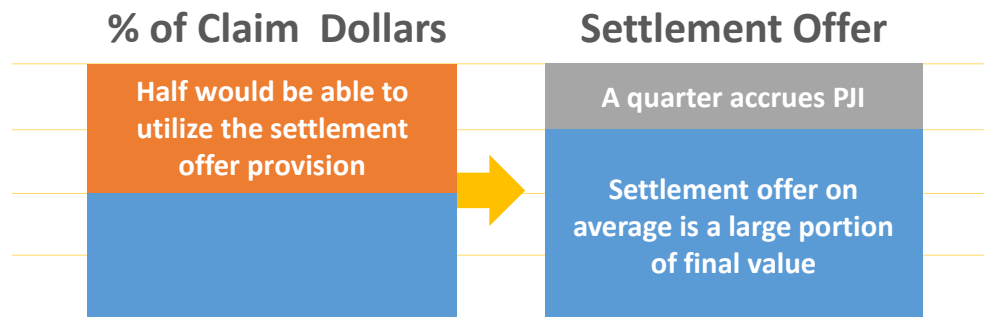


Insights into the settlement offer provision were gained from claims staff

Settlement offer provision:

For settlement offers made within 12 months of filing date, PJI will only accrue on the portion of verdict values in excess of the settlement offer.

Settlement offer offset provision reduces estimates somewhat.



Assumed settlement offer provision would reduce cost impact on both awards and settlements.





Impact on claims resolved by settlement

- Key Statistics and Assumptions

- 3.0% of all claims are taken to trial (some might settle during the trial) and a quarter of those resolve in favor of the plaintiff
- This subset of claims (0.7%) represents a tenth of all claim values
- Total claim value is split consistently between indemnity and defense costs
- Historically on average, the lag from file date to final verdict date was many years
- This law will clearly impact verdict values
- No adjustment made to the historical rate of verdicts

- Findings

- Indemnity payments are expected to increase
- Defense costs are assumed to remain unchanged
- Overall impact is an increase of under 20% to the values of claims resolved from jury verdicts
- Settlement offer offset provision reduces estimates above by a third



Impact on claims resolved by settlement (cont'd)

- **Key Statistics and Assumptions**

- The majority of claims are settled outside of the courts
- Similar indemnity and ALAE split as jury verdicts
- Settlements of less than \$1 million, assumed to be not materially impacted by this bill, represent under a third of total indemnity payments
- The table below illustrates assumed impact on final settlement values of the remaining total indemnity payments (claims greater than \$1 million) by average duration

- **Findings**

- For all claims that resolve by settlement, expect indemnity values increase and defense costs remain unchanged (although that may change)
- Overall impact is around a 5% increase to the values of settled claims
- Settlement offer offset provision reduces the estimates

Duration (Report to Close)	Distribution	6.0% Interest	Adjustment Factor	Impact on Settlement Value
Less than 3 years	50%	9%	.20	2%
3 to 6 years	40%	13%	.50 - .75	15%
More than 6 years	10%	30%	.75	25%



Combining assumptions produces an estimated loading for the cost impact

Impact on Claims Resolved from Jury Verdicts small



Impact on Settled Claims more meaningful



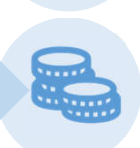
Overall Impact ~5%



Impact of Settlement Offer Provision significant



Estimated Total Impact ~4%



Example #4: Cyber Liability





Impacting Factors

- A public entity pool decides to provide cyber coverage for its members

Pain Points

- Lack of interest from commercial market

Data Limitations

- Sparse historical loss data which doesn't fully reflect future exposure
- Members' rating basis information not captured





Data Provided

- Historical paid and reported loss and ALAE amount and claim status
- Historical exposures – expenditures, populations, services provided
- A summary of historical and current program structure
- Expenses





How to price the risk

- Determine a loss cost at a basic limit (\$100K limit)
 - Develop recent years of loss data and compare to exposures
- How to get to exposures – i.e., data collected, number of records, services provided, quality of security
 - Use size (population) to estimate potential record count
 - Consider impact of services offered to adjust record count
 - Add in bulk adjustments for certain exposures
 - Reasonability check against revenue or expenditures
- How to get losses at higher limits
 - Limited historic data which may not be predictive of future experience
 - Specific industry data is thin so supplement with broader industry data
 - Pricing model used to develop pure premiums and ILFs





The solution

- Expected losses by layer and security
- Expense loading
- Rating structure



What might rates look like?

	Utilities		Consumer Services		Business Services	
	Low Risk	High Risk	Low Risk	High Risk	Low Risk	High Risk
Expected Average Loss						
Small	5,500	5,500	10,000	15,000	6,000	8,000
Medium	6,500	6,500	18,000	30,000	8,000	12,000
Large	11,000	11,000	50,000	110,000	20,000	30,000
Expected Probability of Event						
Small	2%	2%	3%	5%	2%	2%
Medium	2%	2%	4%	7%	2%	3%
Large	2%	2%	7%	12%	3%	5%
Expected Losses (000's)						
Small	110	110	300	750	120	160
Medium	130	130	720	2,100	160	360
Large	220	220	3,500	13,200	600	1,500
Exposure Mix	0.2		0.5		0.3	

Expense Ratio = 30%

Indicated Rates	Low Risk	High Risk
Small	208	445
Medium	434	1,184
Large	1,974	7,094



Example #5: Sexual Abuse and Molestation (SAM)





Impacting Factors

- Legislatures approve “reviver” bills

Pain Points

- Exposure is potentially material
- Lookback periods can be lengthy

Data Limitations

- Limited, if any, historical loss data
- Lack of historical exposures





Data provided

- Historical paid and reported loss and ALAE amounts and claim status
- Denied claims
- Historical exposures – attendance, revenues, population
- Insurance program structure
- Expenses





Determine a frequency – or a range

- Frequency - a comparison of counts and exposures
- How to get to counts and exposures
 - Claims data
 - Denied claims information
 - External sources



One way to look at frequency

Assaults by Age 18

10%

Disclosed by Victim

40%

Not identified by school

50%

Adequate information
to confirm

60%

Estimated potential
frequency

1%

Other considerations

- Length of lookback period
- Length of window
- Location of assault
- Duration of assault





Historical severity may not be relevant

- “Climate” change
- Adjudication process
- Attorney impact
- Claimant characteristics
- Other considerations





The solution

- A range of expected losses
- Monitoring tools



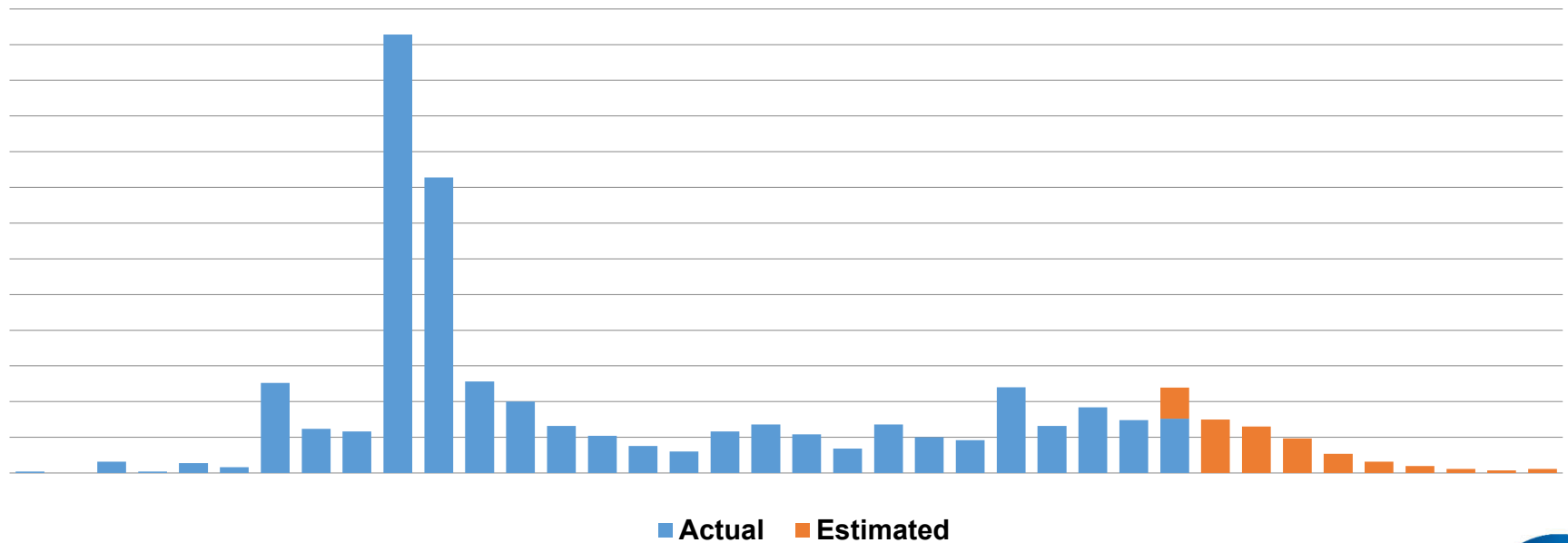
Considering the loss potential

Estimated Frequency	1%	
Estimated Exposures		
1988	1,000	
1989	2,000	
1990	3,000	
Likelihood to Execute		
Low	5%	
High	20%	
Potential Claims	Low	High
1988	1	2
1989	1	4
1990	2	6
Estimated Severity		
Low	75,000	
High	350,000	
Estimated Losses	Low Frequency	High Frequency
Low severity	225,000	900,000
High severity	1,050,000	4,200,000



What might future emergence could look like

Reported Claims



Conclusion





Coming back to the safety net

- New risks challenge our customary ways of pricing
- Thinking through how these risks emerge can frame the pricing
 - Identifying industry data sources
 - Drawing parallels with similar exposures
 - Deploying models
- These examples are a starting point
- Basic rate making principles and the ASOPs can help you “make something out of nothing”





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