OLIVER WYMAN

LEVERAGING RISK MANAGEMENT DATA TO DRIVE INSIGHT AND SAVINGS

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AGENDA

- Why?
- Risk Management Applications
- Examples of Applications
- Call to Action
- Q&A

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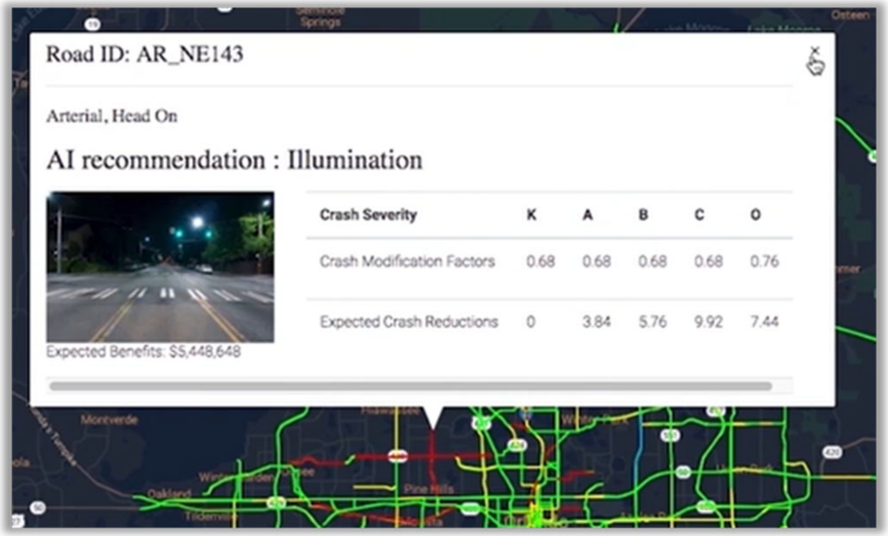
WHY SHOULD YOU CARE?

EXAMPLES FROM OTHER INDUSTRIES

Leveraging Data to Drive Solutions

Industry	Problem	Data Application	Solution/Impacts
Department of Transportation	Increasing number of fatalities/serious injuries on roadways	Data Visualization Predictive Analytics Artificial Intelligence	Develop optimal solution to hazardous conditions; Inform key stakeholders to enable them to reduce/prevent risk of injury.



INVEST IN TECHNOLOGY

Relevance to today's business environment

Technology can make your business more transparent, more flexible, and more efficient

"…the first reason to prioritize digital transformation ahead of or during a downturn is that **improved analytics can help management better understand** the business, how the recession is affecting it, and where there's potential for operational improvements.

…The second reason is that digital technology can help cut costs. Companies should prioritize "self-funding" transformation **projects that pay off quickly, such as automating tasks or adopting data-driven decision making**.

…The third reason is that IT investments make companies more agile and therefore **better able to handle the uncertainty and rapid change** that come with a recession."

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RISK MANAGEMENT APPLICATIONS

LEVERAGING RISK MANAGEMENT DATA

Common Uses of Risk Management Data

- Determine Reserves / Loss Pick
- Compare Actual Losses vs. Expected
- Negotiate Collateral / Premiums
- Optimize Risk Management Program Structure

LEVERAGING RISK MANAGEMENT DATA

Elevated State

AI-Aided Data Visualization

- Identify Cost Drivers
- Track Risk Management Initiatives
- Monitor TPA
- Improve Communication

Predictive Analytics

- Large Claim Identification
- Optimize Intervention
- Optimize Reserving
- Leverage Unstructured Data

Equitable Cost Allocations

- Incentivize Safety
- Enhance Accountability
- Benchmark Internally
- Educate Managers

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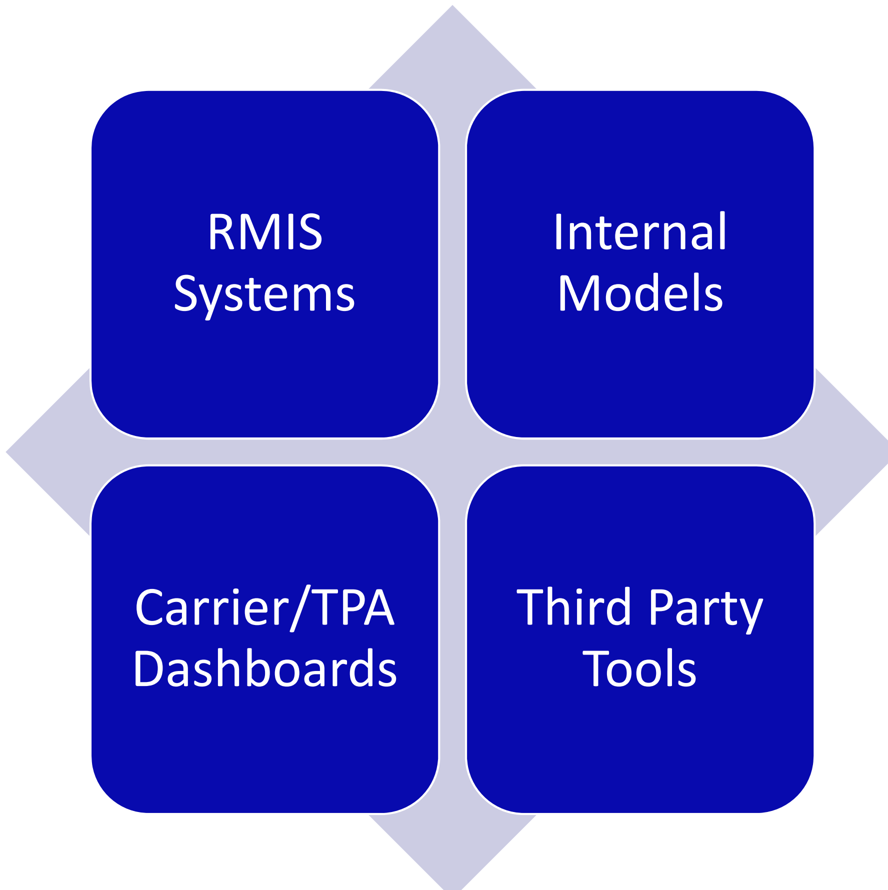
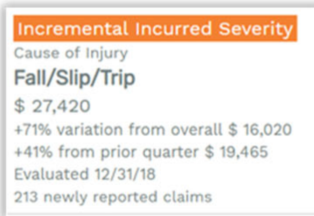
EXAMPLES OF APPLICATIONS

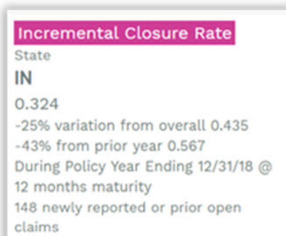
Data Visualization
Examples/Types



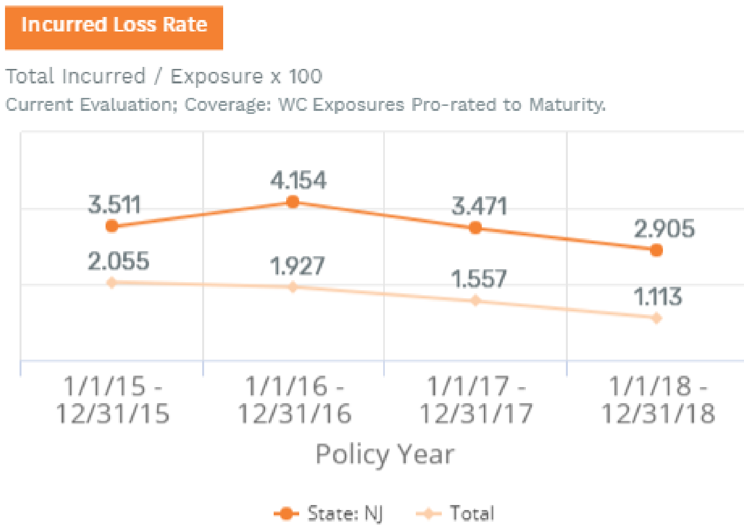
Data Visualization
Demonstration

Client’s actuary leveraged historical loss runs, exposure information and AI to automatically alert user to problematic trends:





Data Visualization
Demonstration



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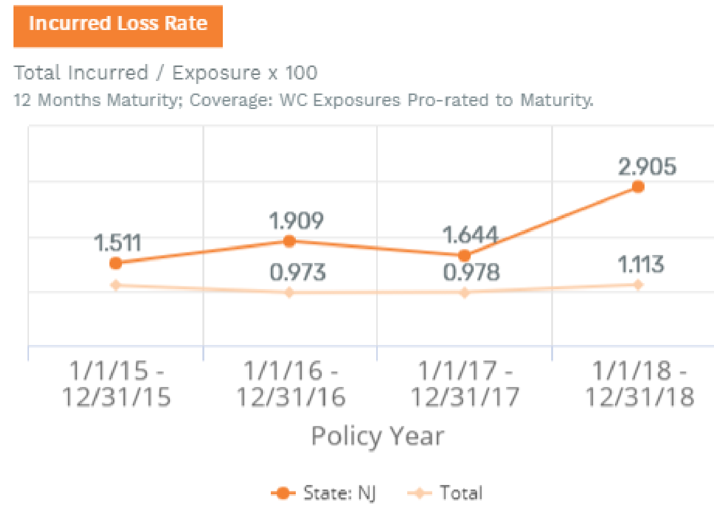

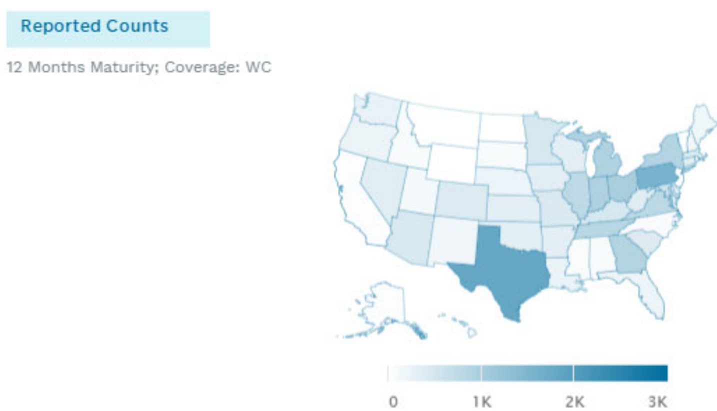

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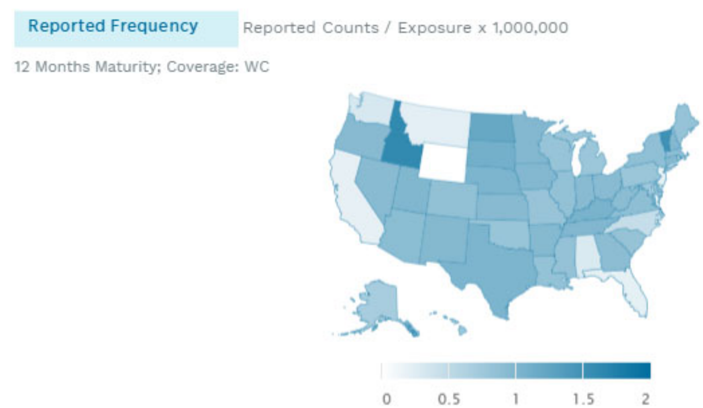
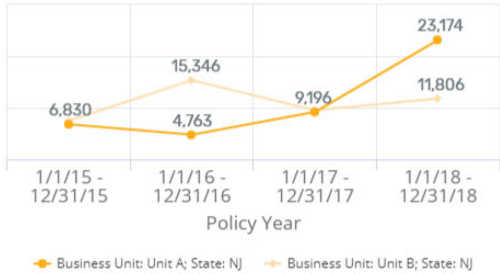


Data Visualization
Demonstration

Paid Severity

Total Paid / Count of Closed Claims
12 Months Maturity; Coverage: WC



Paid Severity

Total Paid / Counts of Closed Claims
12 Months Maturity; Coverage: WC; Business Unit: Unit B; State: NJ

Cause of Injury \ Accident Year	2014	2015	2016	2017	2018
Burn	1,775	2,152		551	
Caught In	1,616	4,286	1,330	5,217	119,160
Struck	4,228	4,955	19,482	4,898	4,237
All Other	1,816	1,305	24,631	1,075	733
Cut	1,734	350	171	374	1,435
Fall/Slip/Trip	14,579	14,522	16,750	12,233	12,969
Motor Vehicle		4,755	7,349	1,476	2,720
Strain	11,567	8,126	16,227	12,316	15,138

Coverage: WC; Business Unit: Unit B; State: NJ; Cause of Injury: Caught In

Show 15 entries

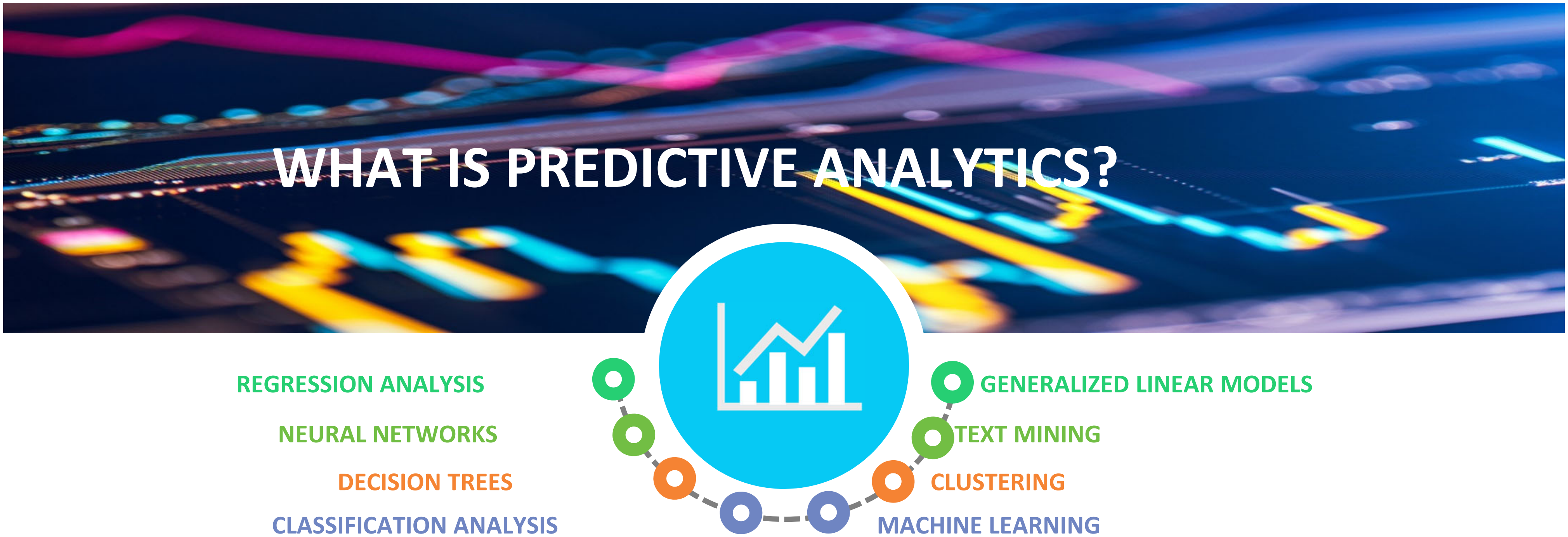
Search:

Prior values as-of 9/30/2018

Claim Number	Business Unit	Location	State	Loss Date	Total Paid	Total Incurred	Prior Total Paid	Prior Total Incurred	Case Reserve	Total Paid Change	Total Incurred Change
NJ20180619104159	Unit B	Location 172	NJ	6/19/2018	$60,973	$142,091	$17,920	$126,347	$81,119	$43,053	$15,744
NJ200504071336	Unit B	Location 516	NJ	4/7/2005	$920,934	$1,425,209	$913,459	$1,425,209	$504,275	$7,476	$0
NJ2017081646044	Unit B	Location 1	NJ	8/16/2017	$13,712	$13,712	$9,063	$16,791	$0	$4,650	-$3,079
NJ20060919110528	Unit B	Location 516	NJ	9/19/2006	$693,742	$874,248	$690,690	$874,248	$180,506	$3,052	$0

PREDICTIVE ANALYTICS

What is it?



BY DEFINITION:

Predictive analytics encompasses a variety of statistical techniques from predictive modeling, machine learning, and data mining that analyze current and historical facts to make predictions about future or otherwise unknown events.

PREDICTIVE ANALYTICS

Leveraging Data

Claim / Incident Information

- Geography
- Report Lag
- Body Part
- Nature of Injury
- Cause of Loss
- Attorney Representation
- Initial Treatment (First Aid / Ambulance)
- Accident / Adjuster Notes
- Weather
- Surveillance Info
- Witness Info
- Department of Occurrence

Medical Information

- Diagnoses (ICD)
- Procedures (CPT)
- Prescriptions (NDC)
- Rehabilitation
- Physical Therapy
- Hospitalization
- Specialist Visits
- Restrictions
- Medical Management

External Data

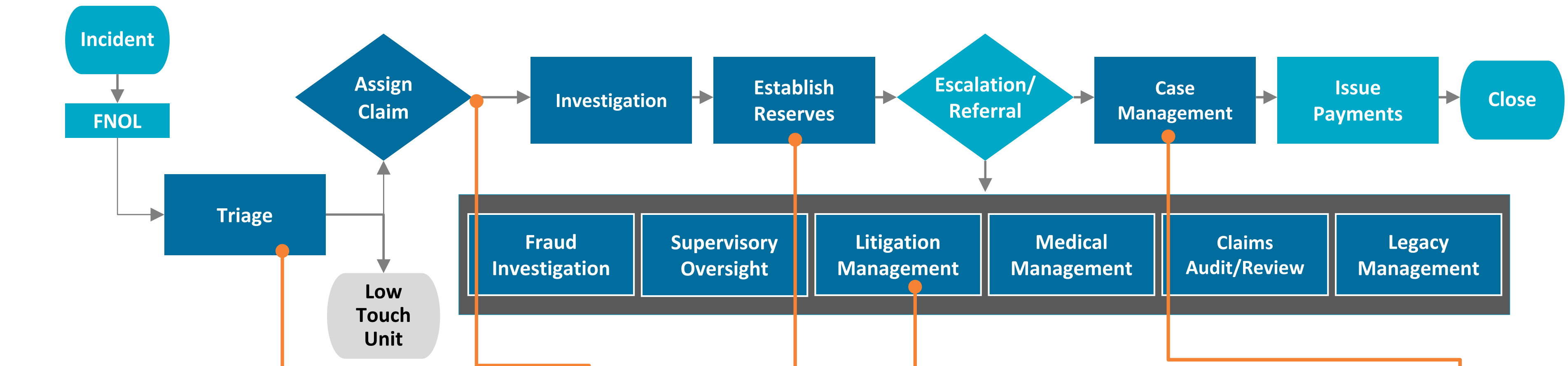
- Industry Claims Data
- Census Demographic Data (crime rates, income, etc)
- Weather Data
- Lawyer Density

Claimant Information

- Geography
- Age
- Sex
- Marital Status
- Tenure

PREDICTIVE ANALYTICS

APPLICATIONS – CLAIM CYCLE



Triage and Claim Assignment

- Improve decision-making through advanced analytics
- Match claim severity with adjuster level
- Fewer reassignments

Early Intervention

- Identify claims with a high likelihood of being large at early stages of investigation
- Deploy more focused resources on claims

Setting Reserves

- Set initial reserve
- Update reserve as new information is known

Litigation Management

- Identify claims with a higher propensity to litigate
- Develop effective resolution strategy
- Match defense counsel with case characteristics

Case Mgmt and Settlement Strategy

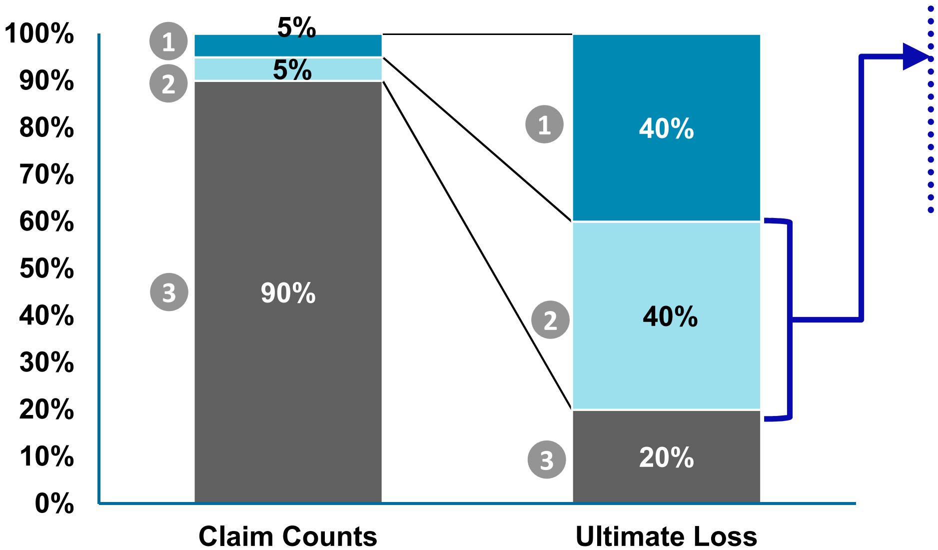
- Identify claims that are likely to develop large later in its life
- Develop settlement strategy to intervene and close “sleeper” claims to avoid high expenses

Predictive Analytics
Sleeper Claim Example

Three Types of Claims

1. Known Large Claims
2. "Sleeper" Claims – Start Small, End Large
3. Known Small Claims

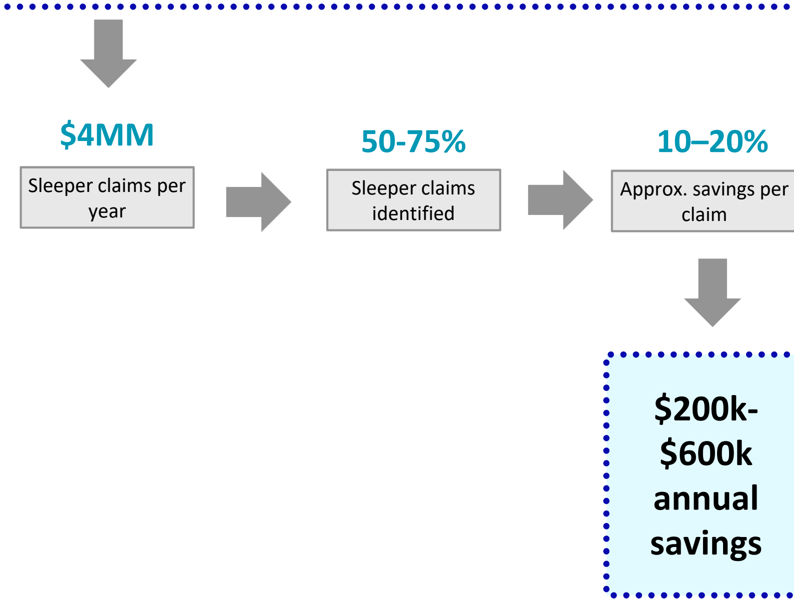
Distribution of Worker's Compensation Claims



Primary Focus of "Sleeper" Model

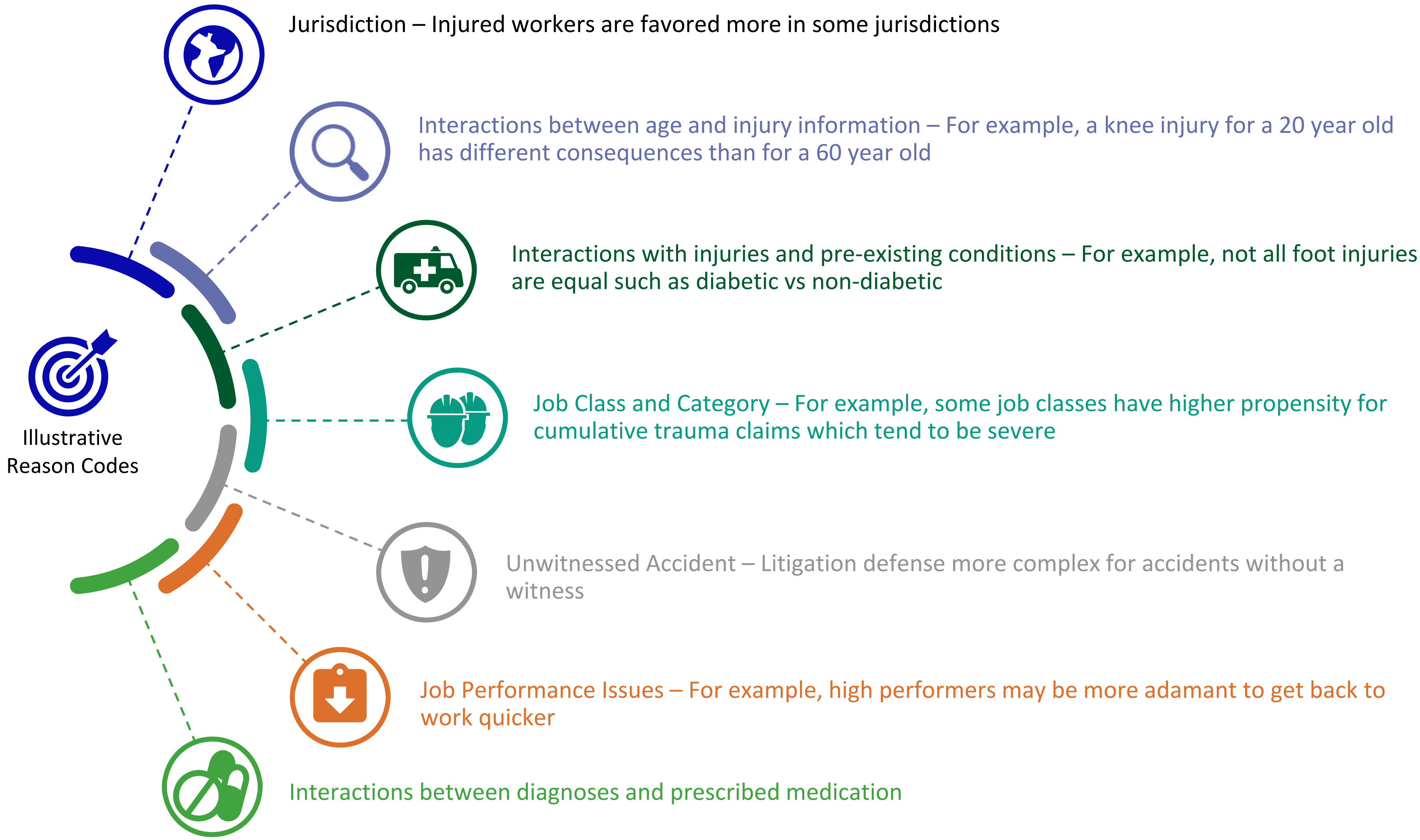
2 **"Sleeper" Claims**

- High cost claims under-reserved early on.
- Sleeper claims only represent ~ 5% of claim counts, however…
- ~ 40% of workers' compensation cost is associated with sleeper claims.
- Expected to contribute $4 million to annual ultimate losses for a client with a $10 million loss estimate.



Predictive Analytics
Driving Insights

UNDERSTAND WHAT'S DRIVING A CLAIM'S SEVERITY / RISK



PREDICTIVE ANALYTICS

Translating Results into Actions

Models should act as a safety net. If a claim's score does not match current actions, the strategy should be adjusted.

Each claim given a new score *daily*, which leads to defined action

- New information vs. claim review every 60-90 days
  - Ex: FNOL may not indicate co-morbidity, prescriptions

Scores pushed to choice of:

- RMIS system
- TPA dashboard
- Email notifications
- Customized webpage

Risk Score ILLUSTRATIVE Guidelines:

Risk Score of "< 4"

- 70% lowest risk claims
- Follow current procedure
- Likely assigned to junior adjuster
- Likely lower priority for monitoring

Risk Score of "4"

- Next 20% highest risk claims
- Assigned to senior adjuster
- Nurse case management applied
- Carefully monitored

Risk Score of "5"

- Top 10% highest risk claims
- Assigned to most senior adjusters
- Swift and aggressive investigation
- Nurse case management applied

Use data visualization to track performance

PREDICTIVE ANALYTICS

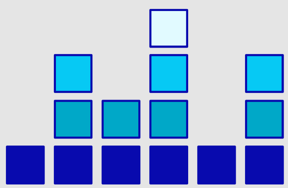
Importance of a Tailored Approach

Traditional Claim Management
The claims management process is increasingly complex, making it difficult for teams to anticipate and prioritize resources.

Proactive Claim Management
Implementation of diagnostic tools and predictive models provide a more consistent, data driven approach to the process, allowing for efficient deployment of resources and lower cost outcomes.

Comparative analytics

Benchmarking
Baseline industry loss cost comparisons



Lag time, cause of loss, nature of injury

Portfolio predictive modeling

Portfolio view
Industry specific view of claims severity potential by claim type

Client losses run through portfolio predictive model

Client specific predictive modeling

Customized
Inform additional incremental cost saving opportunities

Bespoke model based on client specific claims data

Custom tailored models offer tremendous advantages over readily available portfolio models through…

- Tailoring to client data structures
- Tailoring to client needs
- Tailoring to client risk profiles
- Tailoring to client workflows
- Advanced Modelling Techniques
- Text Mining
- External Data (Census Demographics, Weather, etc)
- Providing transparency

COST ALLOCATIONS

What and why

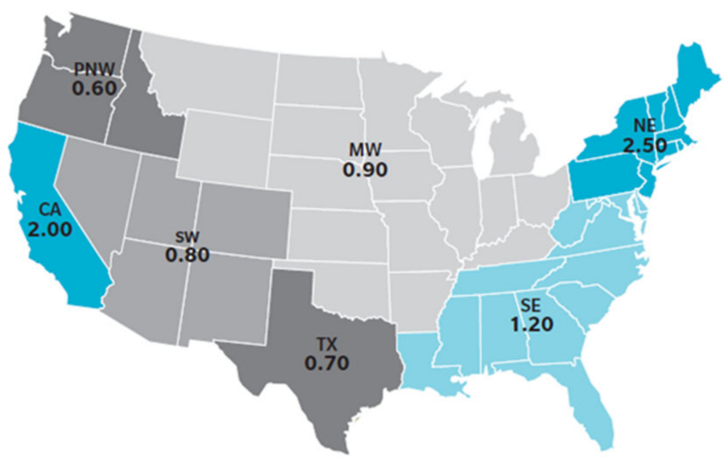
An allocation is a means of assigning total amounts to individual cost centers, business units or locations

What can be allocated:

- Retained unpaid claim estimates
- Prospective year retained loss forecasts
- Commercial insurance premiums
- Other associated program costs

Benefits of allocations:

- Equitable distribution of costs
- Financial incentives to reduce losses
- Division/location leader accountability
- Benchmark individual experience versus total



COST ALLOCATIONS

Goals drive the design

The ideal allocation methodology for your organization depends on your goals.

Accountability and Responsiveness

Hold cost centers responsible for their own claims experience and quickly respond to changes in their behaviors.

Incentivize Desired Behaviors

Reward lower than average costs to incentivize desired safety and loss control protocols

Equity and Fairness

Allocate a fair cost given the individual cost center's size and risk profile

Easy to Explain

Cost centers will likely support and have confidence in a model only if they are able to understand it

Stability

Determine your tolerance for year over year fluctuations in individual cost center allocations

COST ALLOCATIONS

Potential data and design elements

Potential Data

- Losses
  - Paid
  - Incurred
- Claim Counts
  - Consider lost-time, excluding nuisance, etc.
- Exposures
  - Payroll, sales, vehicle counts, etc.
  - May include risk adjustments
- Industry Benchmarks
  - Expected loss rates
  - Commercial premium quotes
- Non-insurance data
  - Safety statistics
  - Safety or satisfaction scores

Design Elements

- Experience Period
  - Number of years of historical losses to include
  - Potential to exclude immature periods
- Caps on Individual Claims
  - To moderate the impact of a severe loss on an individual cost center
- Credibility
  - Allows model to be more responsive to actual experience of larger cost centers and less responsive for smaller cost centers with volatile experience
- Limitations on Year Over Year Changes
  - Limitation on percentage change in an individual cost center's allocation rate from year to year for an element of stability

COST ALLOCATIONS

Illustration

ABC Restaurant Group retains $1 million per occurrence for its workers compensation program. The projected retained losses for policy year 2019 ($7.8 million) need to be allocated between ABC's three divisions for budgeting purposes.

Option 1: Allocate the forecasted losses based on projected payroll by division.

Division	2019 Payroll ($Millions)	% of Total	2019 Loss Projection
Div 1	300	51%	4,000,000
Div 2	60	10%	800,000
Div 3	225	38%	3,000,000
Total	**585**	**100%**	**7,800,000**

Pro: Simple to calculate and explain

Con: Doesn't reflect differences in loss rates by division

Option 2: Allocate the forecasted losses based on benchmark losses by division.

Division	Benchmark Loss Rate	Expected Ultimate Loss	% of Total	2019 Loss Projection
Div 1	0.70	2,091,153	25%	1,978,190
Div 2	1.15	687,269	8%	650,143
Div 3	2.43	5,466,993	66%	5,171,667
Total		**8,245,415**	**100%**	**7,800,000**

Pro: Reflects exposures and expected differences in loss rates by division

Con: Doesn't reflect actual loss experience by division

COST ALLOCATIONS

Illustration

Option 3: Allocate the forecasted losses based on experience-modified benchmark losses by division.

Division	5 Year Actual Reported ($1Mill)	5 Year Benchmark Reported ($1Mill)	Experience Modification Factor	2019 Expected Ultimate Loss	2019 Modified Expected Ultimate Loss	% of Total	2019 Loss Projection
Div 1	8,042,851	7,651,456	1.05	2,091,153	2,198,122	28%	2,189,319
Div 2	1,884,598	1,548,926	1.22	687,269	836,209	11%	832,860
Div 3	16,664,141	18,991,480	0.88	5,466,993	4,797,032	61%	4,777,821
Total	**26,591,590**	**28,191,862**	0.94	**8,245,415**	**7,831,363**	**100%**	**7,800,000**

A review of more detailed data for Division 2 suggests potential model adjustments to consider.

Policy Year	Reported Loss ($1Mill)	Experience Modification Factor ($1Mill)	Reported Loss ($250k)	Experience Modification Factor ($250k)
2014	124,309	0.47	124,309	0.50
2015	1,179,567	3.91	329,567	1.15
2016	96,596	0.29	96,596	0.30
2017	169,737	0.48	169,737	0.50
2018	314,389	1.06	314,389	1.10
5 Yr Total	**1,884,598**	**1.22**	**1,034,598**	**0.70**
3 Yr Total	**580,722**	**0.59**	**580,722**	**0.61**

Division 2 experienced two large (over $250k) claims in policy year 2015. As a result, the indicated experience modification factor varies significantly depending on the selected experience period and per-claim limitation.

COST ALLOCATIONS

Illustration

Experience Period: longer period is more stable; shorter period is more responsive

Credibility: for smaller divisions, indicated experience modification factor can be tempered using credibility

Division	5 Year Actual Reported ($250k)	5 Year Benchmark Reported ($250k)	Experience Modification Factor	2019 Expected Ultimate Loss	2019 Modified Expected Ultimate Loss	% of Total	2019 Loss Projection	2019 Allocated Rate
Div 1	7,742,851	6,917,898	1.12	2,091,153	2,340,521	30%	2,371,717	0.79
Div 2	1,034,598	1,482,467	0.70	687,269	479,638	6%	486,031	0.81
Div 3	16,229,141	18,191,542	0.89	5,466,993	4,877,245	63%	4,942,252	2.20
Total	**25,006,590**	**26,591,907**	0.94	**8,245,415**	**7,697,404**	**100%**	**7,800,000**	**1.33**

Individual Claim Limits: lower limits mitigate the impact of severe losses

Rate Caps: caps on year over year changes in allocation rates are another option to add stability to the model

4

WHAT CAN YOU DO?

NEXT STEPS

1. Maximize use of data visualization process. Ask yourself whether your process involves:
   - Artificial Intelligence/automation for ease of use
   - Proper year-over-year comparisons
   - The ability to monitor your TPA
   - Easy communication with key stakeholders

2. Incorporate predictive analytics into risk management process:
   - Use analytics to identify issues and determine optimal responses.
     - Think through your claim process – what could be improved?
   - Communicate with stakeholders to understand what is possible.
   - Track progress of action using data visualization.

3. Re-think your allocation; considerations include:
   - Accountability, responsiveness, sensitivity
   - Does your allocation incite desirable behavior?
   - How equitable is your process?
   - Can your process be explained simply?

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QUESTIONS?

THANK YOU!

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APPENDIX

SOURCES

- **Examples from Other Industries:**
  - https://www.transportation.gov/solve4safety/challenge
  - http://www.govtech.com/analytics/Real-Time-Data-Analytics-Aims-to-Reduce-Traffic-Fatalities.html

- **Invest in Technology:**
  - https://hbr.org/2019/05/how-to-survive-a-recession-and-thrive-afterward