
Claims/Agency Metrics & Other Non-Traditional Applications of Predictive Modeling

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CAS Predictive Modeling Seminar

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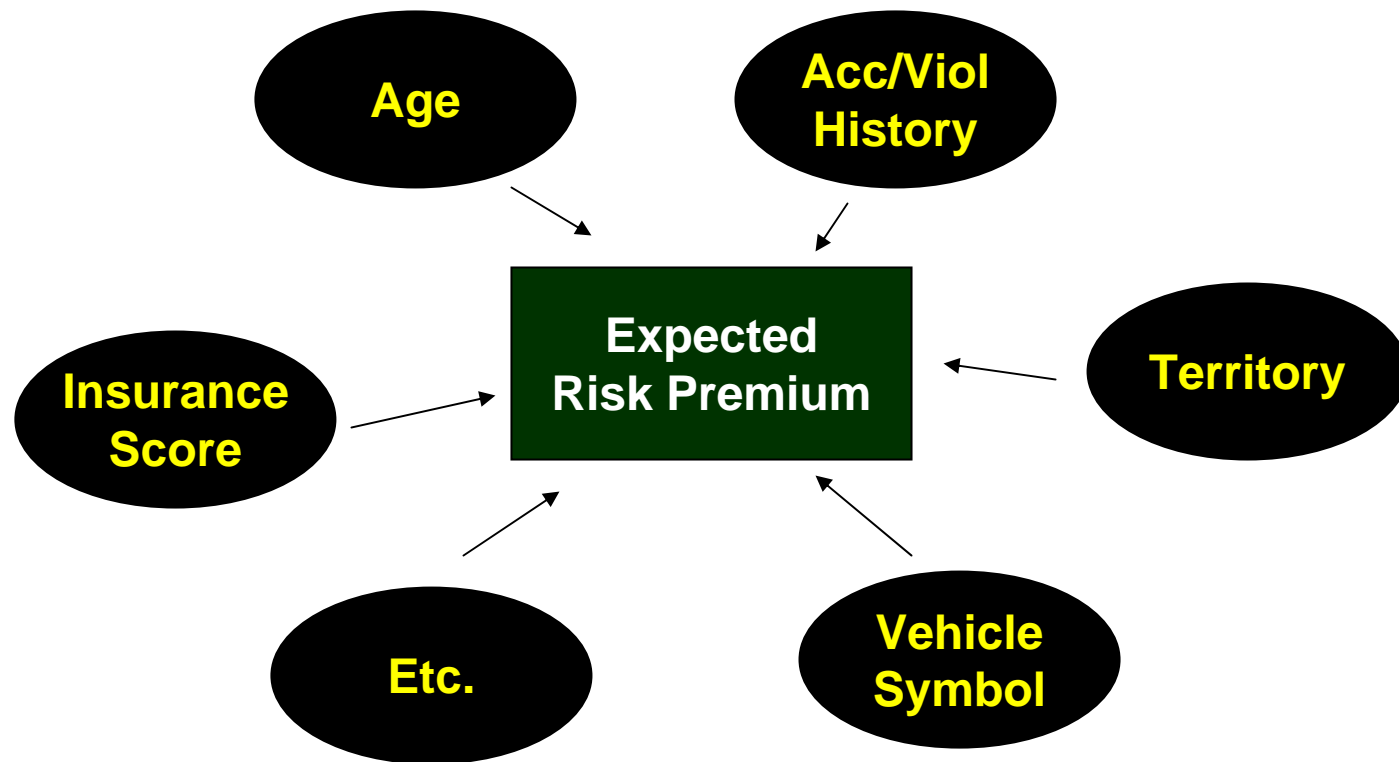
Chicago, IL

Discussion Topics

- Why use predictive modeling for claims and agency management?
- Claims Applications
 - Benchmarking of claims handlers
 - External claim service providers
 - Attorney involvement
 - Likelihood of claim evolution
- Agency management

Why Use Predictive Modeling for Claims and Agency Applications?

General Application of Predictive Modeling to Insurance Pricing

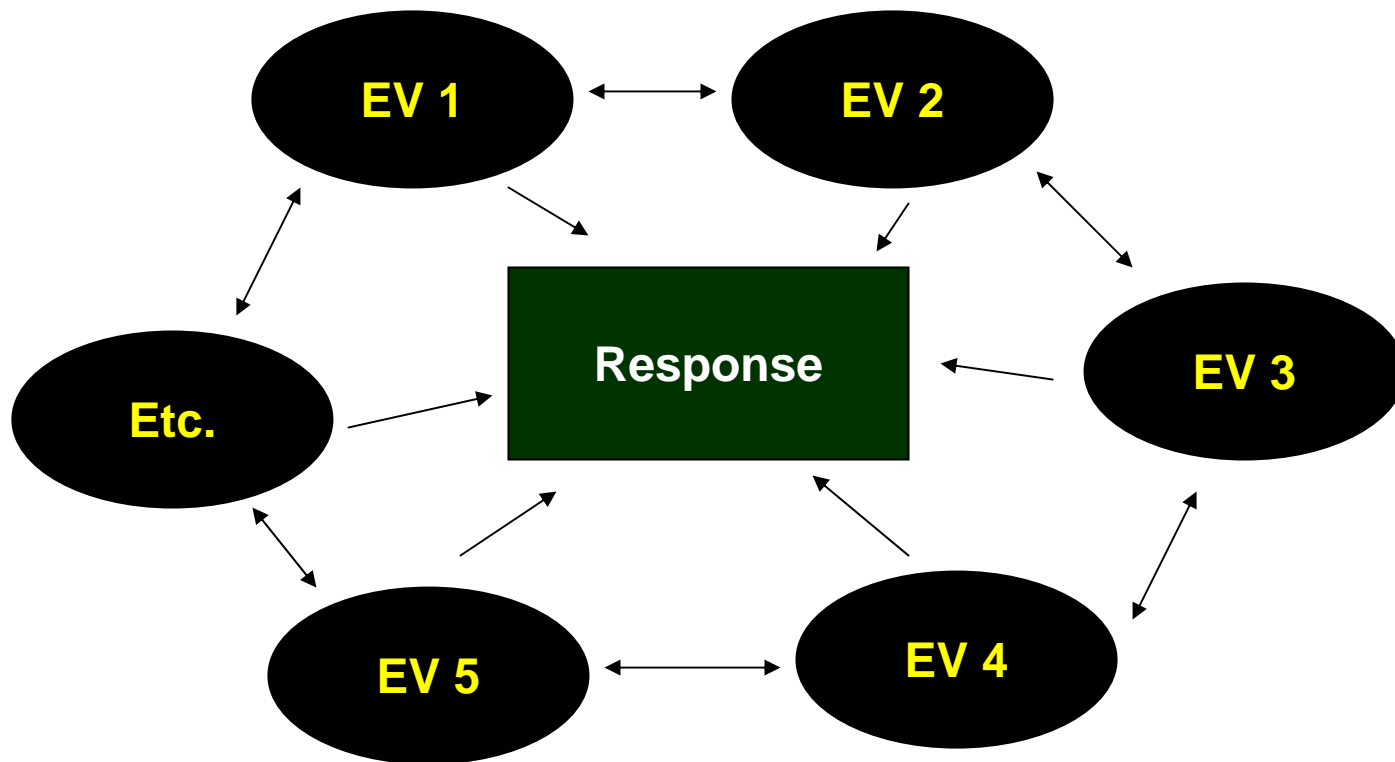


Why Use Multivariate Analysis

- Traditional Actuarial Approach:
Analyze each rating factor independent of all the other factors
- Inherent Assumption: Distribution of all other rating variables is constant
- Multivariate Analysis:
Analyze each factor simultaneously, thus removing the distributional bias



Why Stop There?



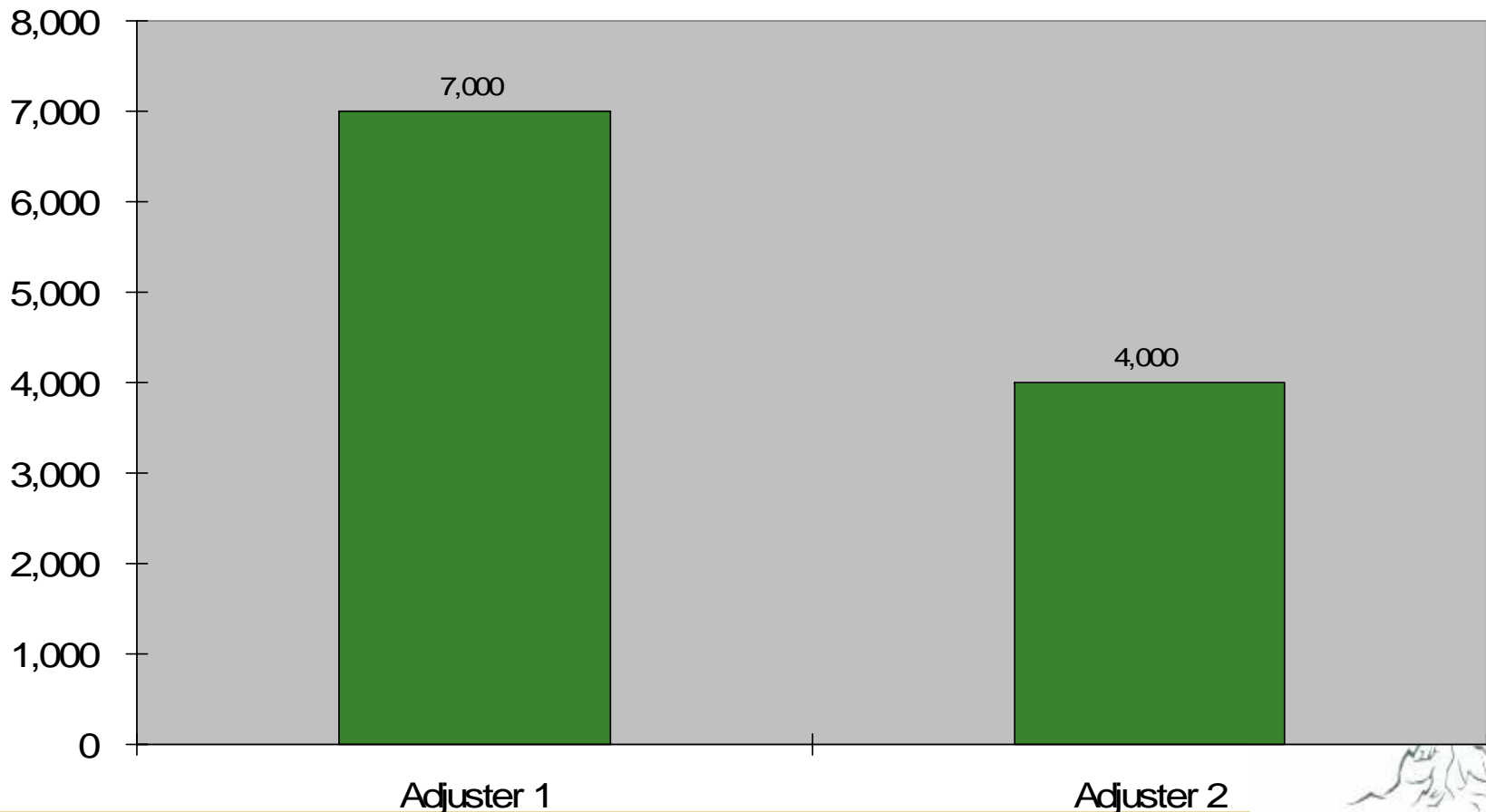
Claims & Agency Management

- Currently, many evaluations of performance are based on “one-way” analyses
 - Claim service providers – average severities
 - Agencies – loss ratio, frequency, severity
- Predictive Modeling Approach: Using predictive modeling, determine value added or detracted by service provider
 - Treat service provider as another explanatory variable
 - Result of analysis is value added or detracted by provider

Claims Applications



Average Case Reserves by Adjuster

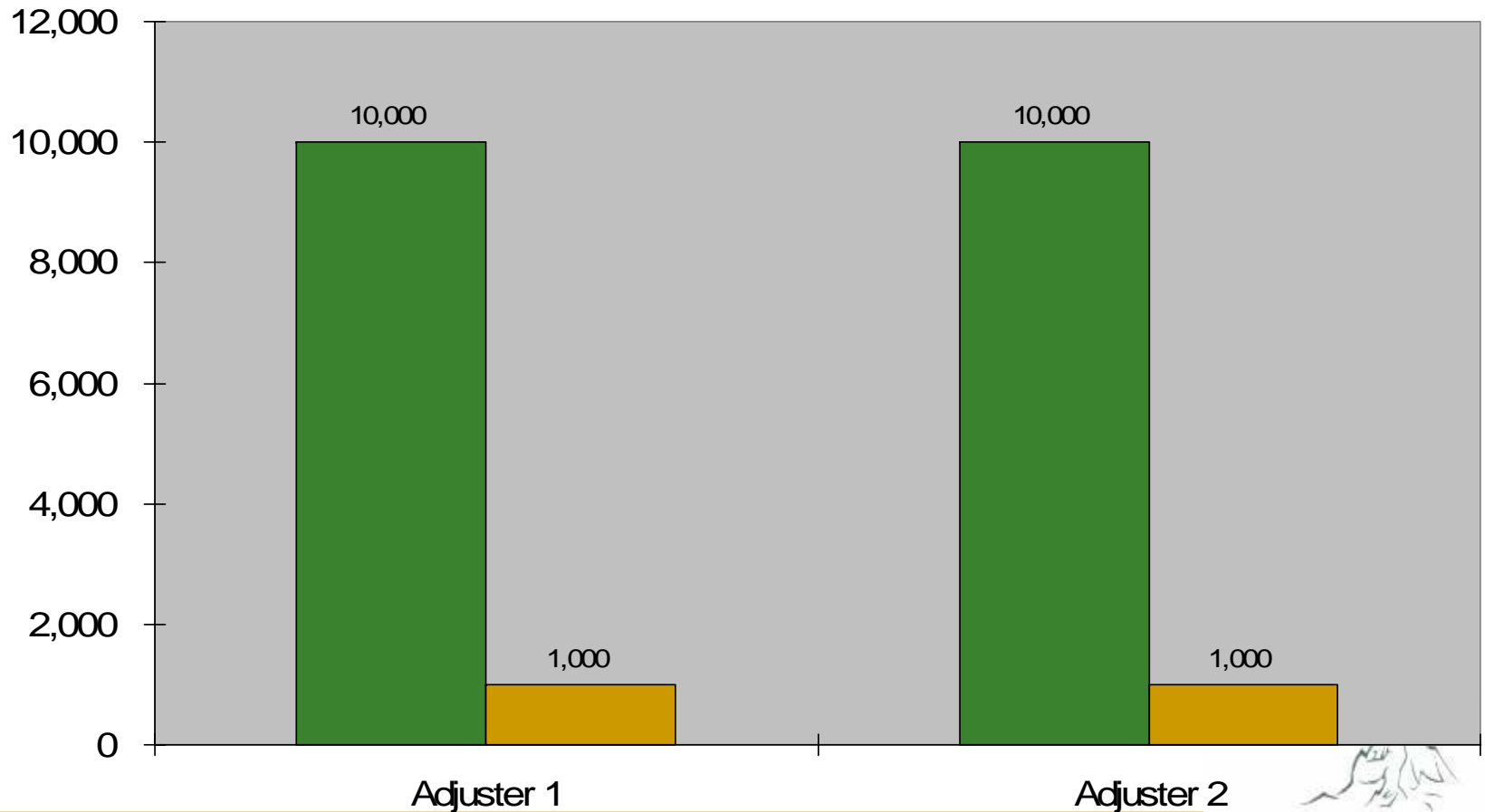


■ Average Case Reserves

Claims Application Topics

- Claim adjuster evaluation
- Claim service providers
- Potential extended analyses

Average Case Reserves by Adjuster

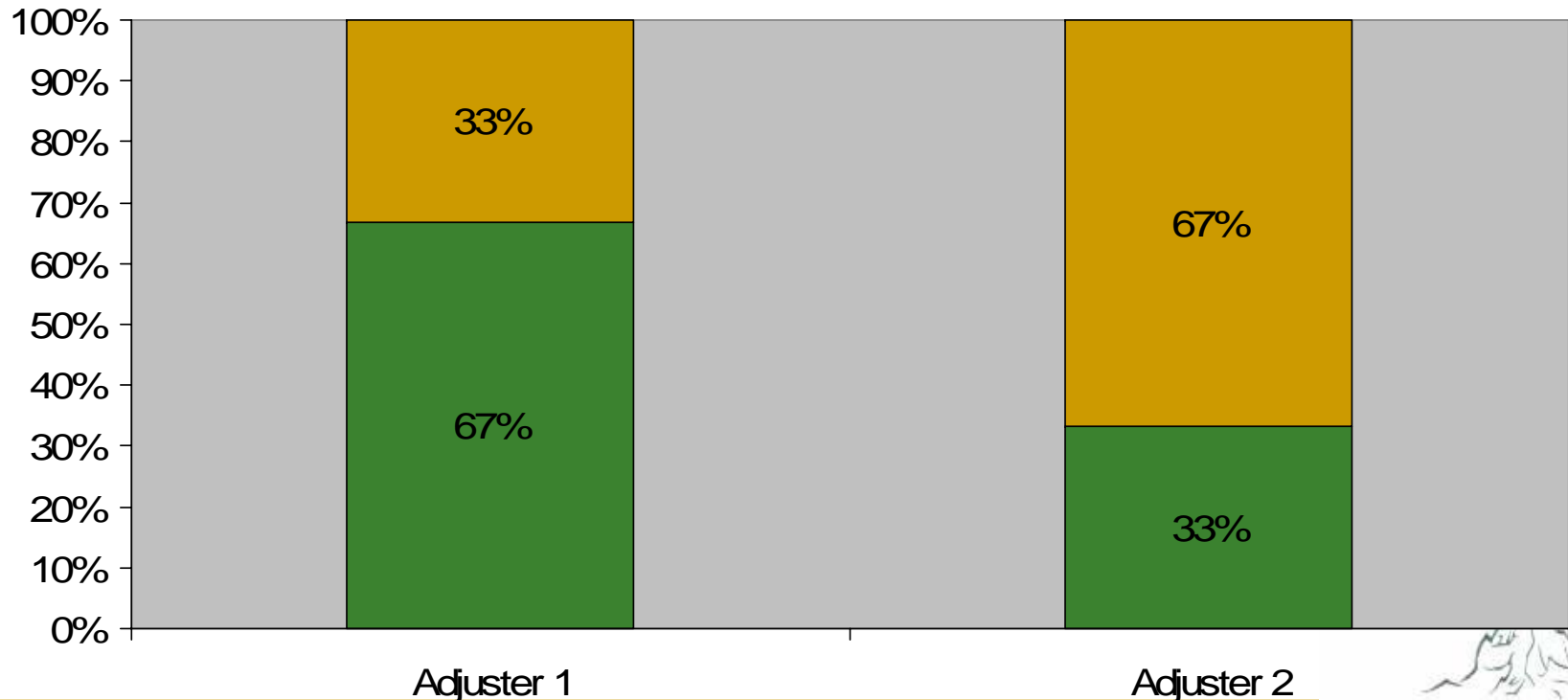


■ Average BI Case Reserves

■ Average PD Case Reserves

Claim Type Mix by Adjuster

Claims Mix by Adjuster



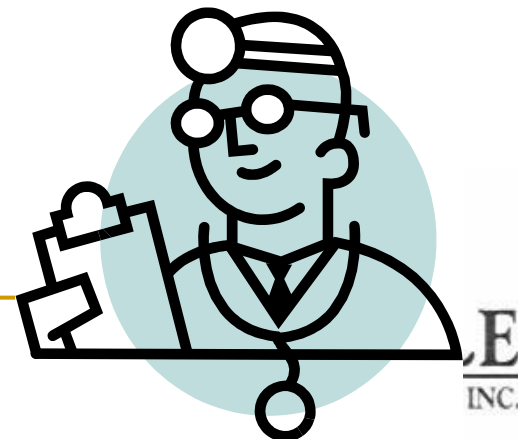
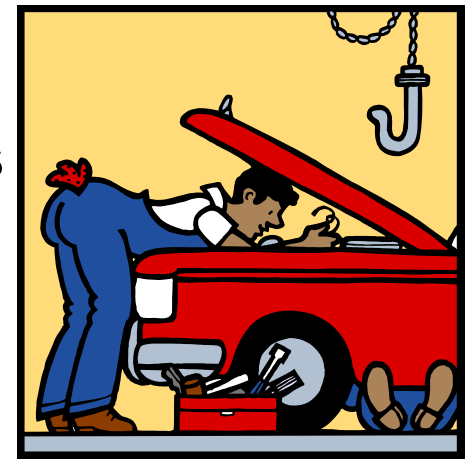
■ BI Claims

■ PD Claims

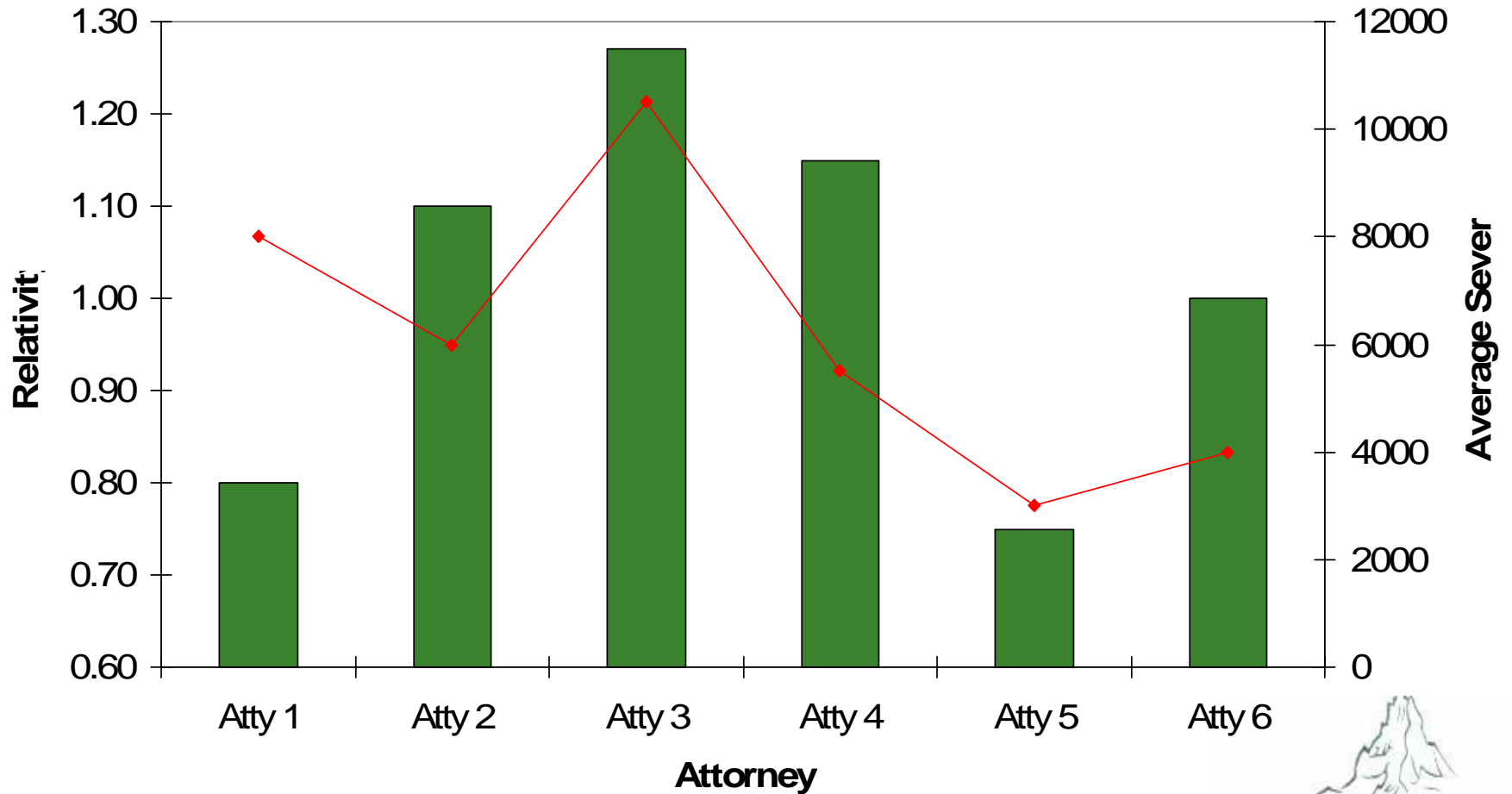
Utilization Review

Utilization reviews look at the behavior of any provider of services to the claims process:

- **Treatment Providers**
 - **Doctors & Hospitals**
 - **Vocational Rehabilitation Centers**
 - **Auto Repair Shop**
 - **Auto Glass Companies**
 - **Special Investigation Units**
 - **Lawyers**
- **Court/Resolution Systems**

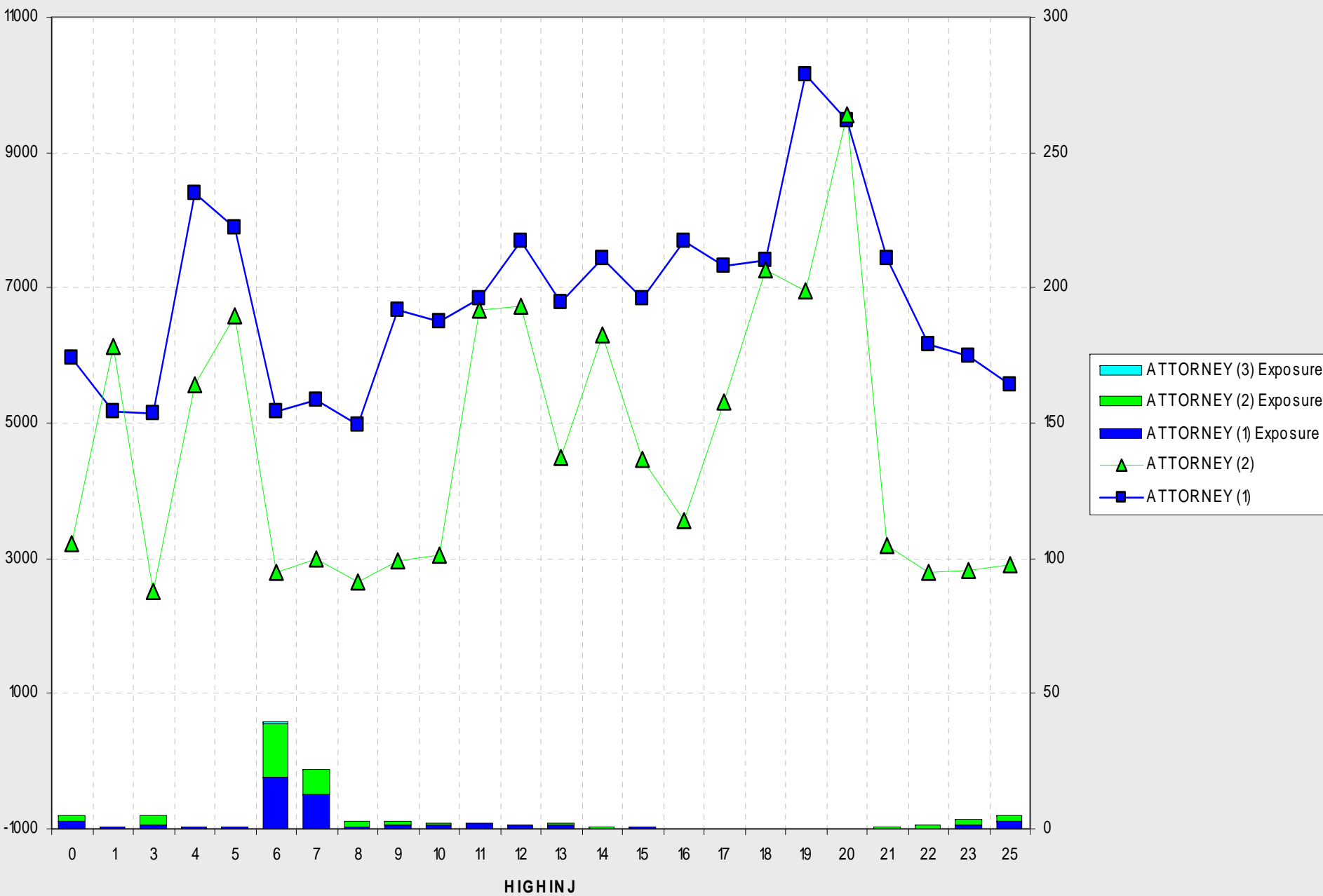


Attorney Relativities



■ Relativity ◆ Average Severity

Impact of Attorney Involvement on Claim Severity

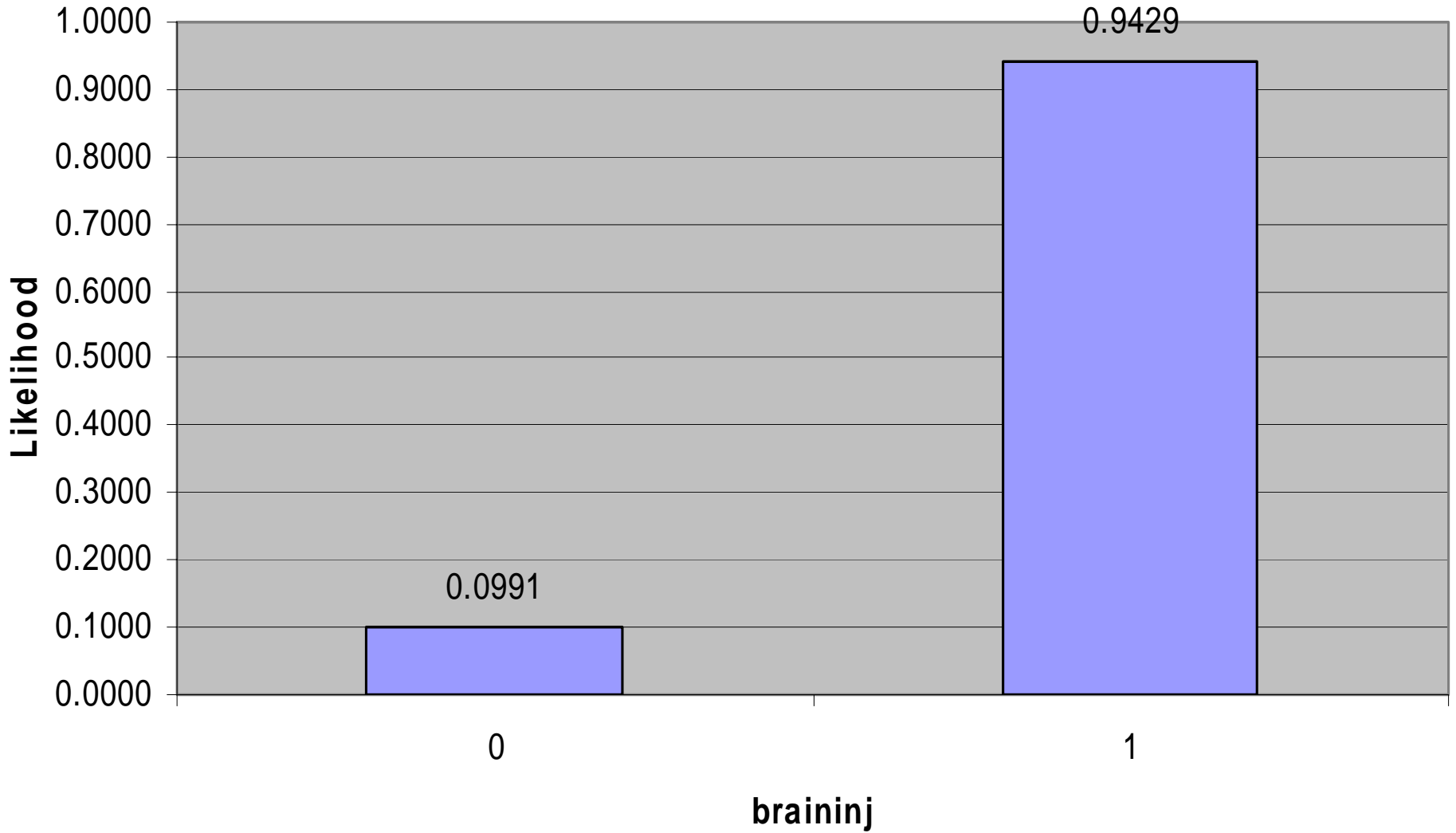


Case Study Regarding the Evolution of a Claim - Likelihood of Bodily Injury Claim

Likelihood of BI claim

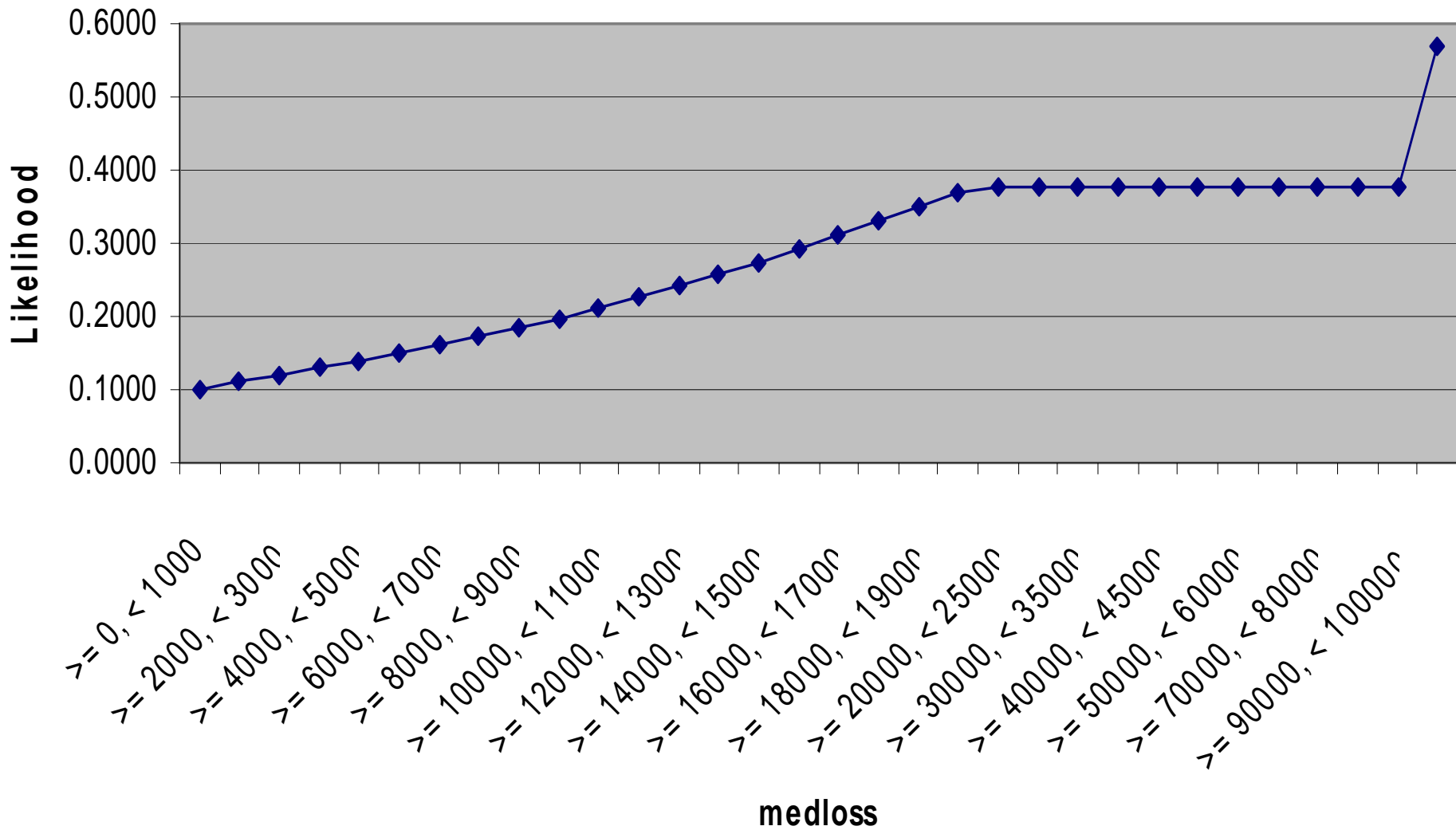
- The problem...
 - Based on the characteristics of a given a PIP claim,
 - What is the likelihood of a BI claim developing?
- Analysis: logistic regression model
- Data
 - 1994 Insurance Research Council Claim Study
 - Personal Injury Protection Data for FL
 - Response: Claim piercing the PIP threshold

Relative Likelihood of BI Claim



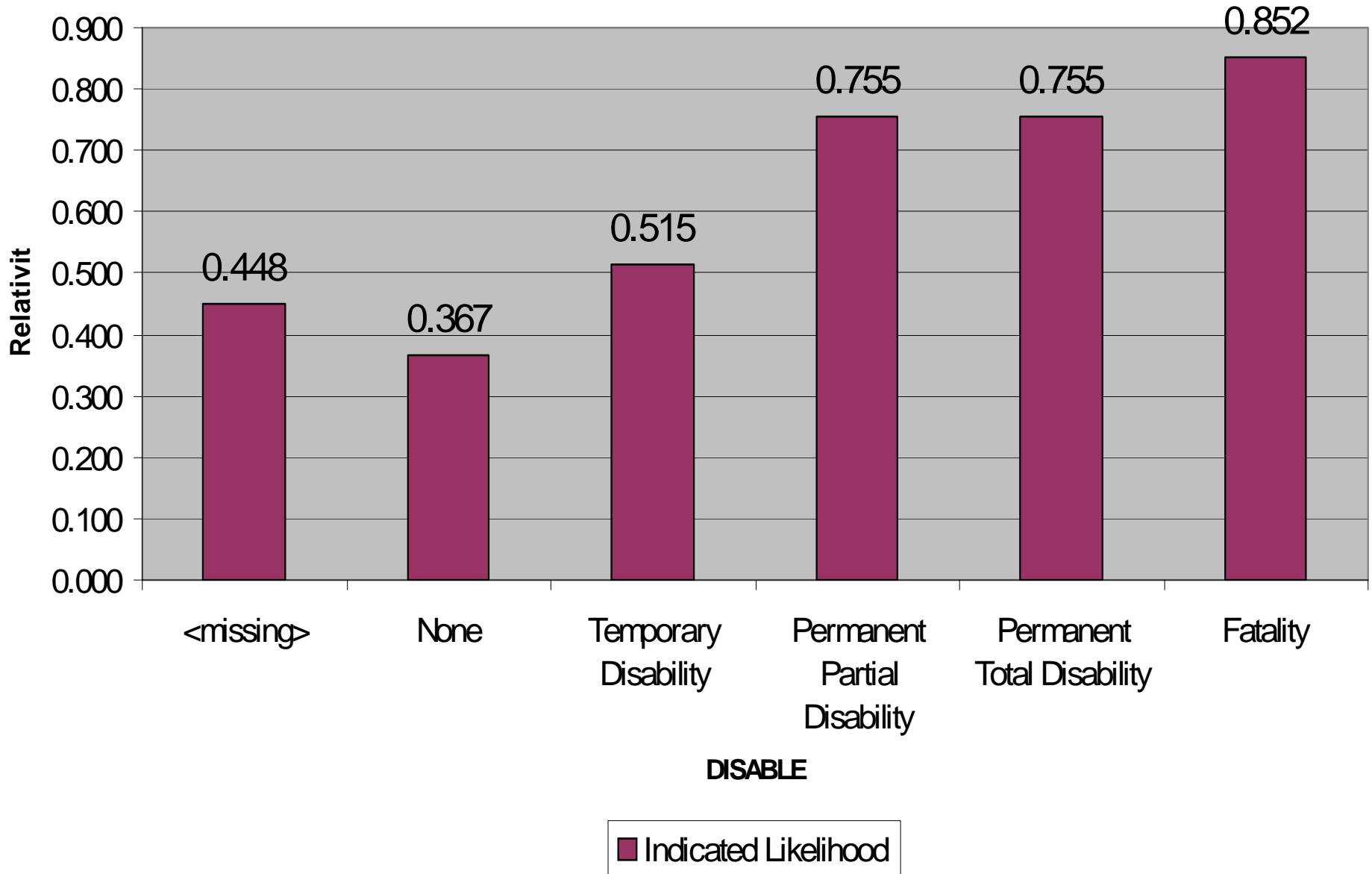
■ Likelihood of BI

Relative Likelihood of BI Claim

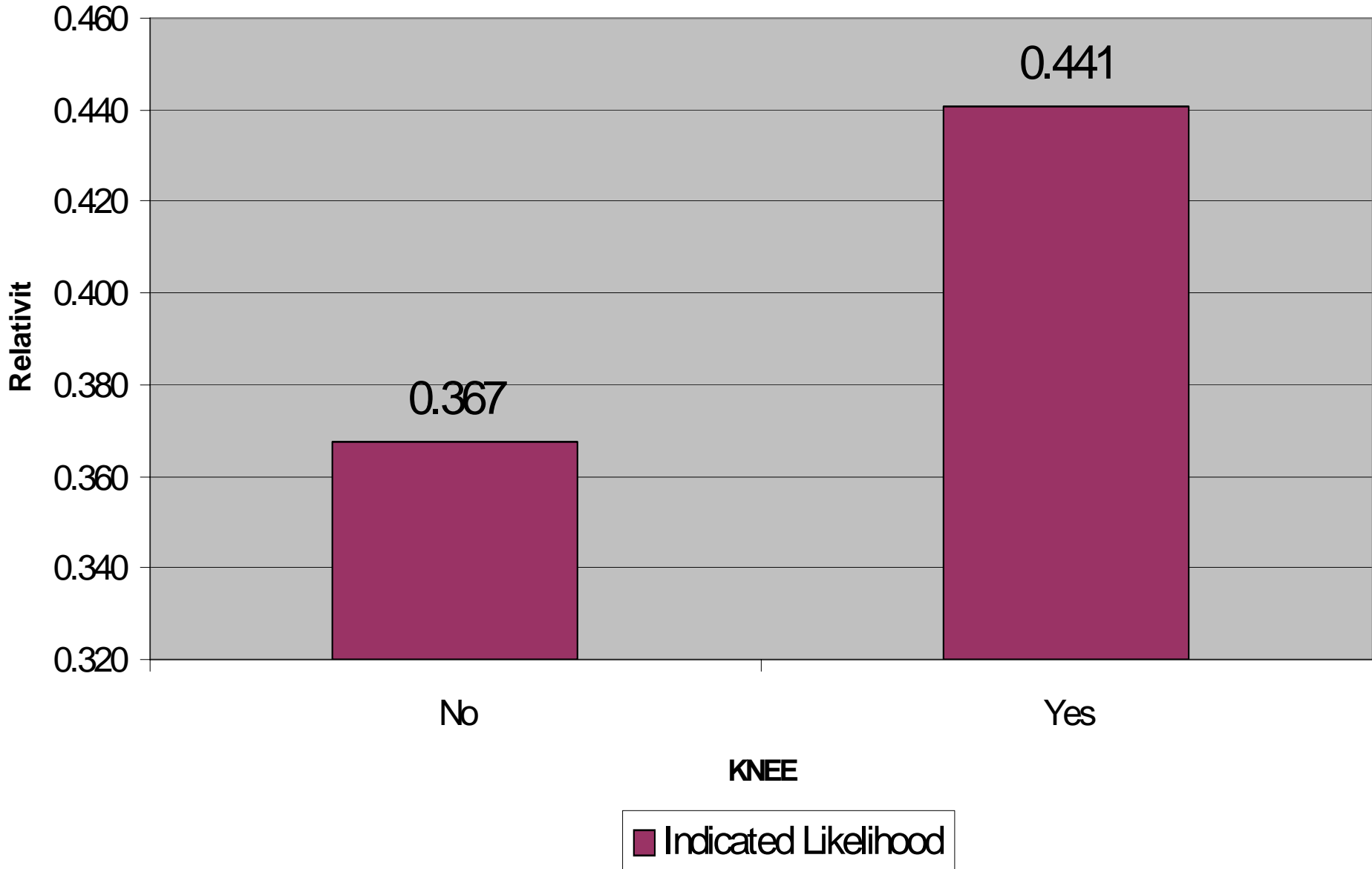


◆ Likelihood of BI

Florida PIP Analysis with Loss



Florida PIP Analysis with Loss



Applications

- Improved assignment of claim to claim handlers
- Alert claims person to higher value claims
- Better assignment of claims to service providers
- Early warning of a PIP claim that may turn into a liability claim

Agency Management

Agency Management

■ Review of agency experience can impact:

- ❑ Commission scales
- ❑ Contingent commissions
- ❑ Advertising and promotions budgets
- ❑ Agency retention or cancellation



■ Significant differences in books of business (line, class, geography, maturity) can exist between agencies

Scenario

- **You are the Product Manager for a Workers Comp Insurance Company with a large book in the state of CAos.**
- **Your company writes a broad book of business.**
- **There is no territorial differentiation in the current rating plan.**

Scenario (cont'd)

- **Management is attempting to get more cross-functional involvement in the organization and has asked that you provide quantitative support to the Marketing/Agency team in assessing agency performance.**
- **Historically, Marketing has relied on existing management reports in performing agency reviews (see attached).**

The Legendary Agency Report

The Chuck Natas Report

Agent	Curr WP	Prior WP	2 nd Prior WP	Current Paid	Prior Loss Ratio	2 nd Prior Loss Ratio	Current Incurred	Prior but Not Real	2 nd Prior Real	Current Incurred	Prior Loss Ratio	2 nd Prior Loss Ratio
0001	250	400	550	17.0%	65.5%	72.0%	17.7%	21.3%	24.5%	52.3%	108.2%	121.0%
0003	300	333	367	20.9%	39.5%	64.0%	14.8%	15.8%	21.5%	50.6%	71.1%	106.9%
0005	1,300	1,275	1,200	33.5%	84.3%	67.0%	11.0%	12.8%	23.9%	55.5%	109.9%	114.9%
0007	75	75	500	12.8%	44.0%	44.0%	11.9%	21.2%	16.2%	36.6%	86.5%	76.3%
0010	190	250	225	35.3%	48.6%	87.0%	19.4%	18.1%	12.4%	74.1%	84.7%	111.8%
0013	222	600	246	45.0%	46.8%	54.0%	15.7%	16.6%	15.0%	76.4%	80.1%	83.9%
0017	800	900	1,100	30.7%	38.5%	93.0%	20.8%	14.5%	11.9%	72.3%	67.6%	116.7%
0020	1,750	1,800	1,875	41.0%	77.2%	25.0%	12.3%	15.7%	18.0%	65.6%	108.6%	61.1%
0024	1,400	1,397	1,414	6.3%	82.2%	53.0%	12.4%	12.3%	10.6%	31.2%	106.8%	74.3%

Scenario (cont'd)

- **You have good sources for premium and loss data at the policy level that includes:**
 - ❑ **Policy Number**
 - ❑ **Agent**
 - ❑ **Principal Industry Group**
 - ❑ **Primary Territory (Metro, Suburban, and ROS)**
 - ❑ **Premium**
 - ❑ **Incurred Loss**

The Data

Pol_Num	Agent	Industry_Group	Territory	Premium	Loss
0000001	Scarlet Heights	Contracting	Suburban	3,427	6,553.48
0000002	Clear Creek	Office/Clerical	ROS	4,843	-
0000003	Clear Creek	Manufacturing	ROS	6,219	848.79
0000004	Blacksburg	Contracting	ROS	7,128	-
0000005	White Oak	Contracting	Suburban	1,465	4,408.59
0000006	Brownsville	Retail/Service	Suburban	6,286	-
0000007	Yellowstone	Retail/Service	Suburban	1,306	573.74
0000008	Yellowstone	Manufacturing	Suburban	17,031	14,831.60
0000009	Redding	Retail/Service	ROS	4,006	-
0000010	Scarlet Heights	Office/Clerical	Suburban	4,775	436.15
0000011	Redding	Office/Clerical	Metro	4,005	-
0000012	Grayston	Office/Clerical	Suburban	3,357	877.44
0000013	White Oak	Retail/Service	Metro	1,903	1,143.71
0000014	Blacksburg	Retail/Service	ROS	3,192	3,393.50
0000015	Greenfield	Office/Clerical	ROS	3,876	1,084.90
0000016	Scarlet Heights	Manufacturing	Suburban	4,639	7,374.45
0000017	White Oak	Retail/Service	Suburban	15,035	20,596.04
0000018	Scarlet Heights	Office/Clerical	Metro	1,181	487.62
0000019	Grayston	Contracting	Metro	12,583	23,084.78
0000020	Scarlet Heights	Contracting	Suburban	4,728	2,066.53
0000021	Brownsville	Office/Clerical	Suburban	14,500	7,332.13

The Data – A Snapshot

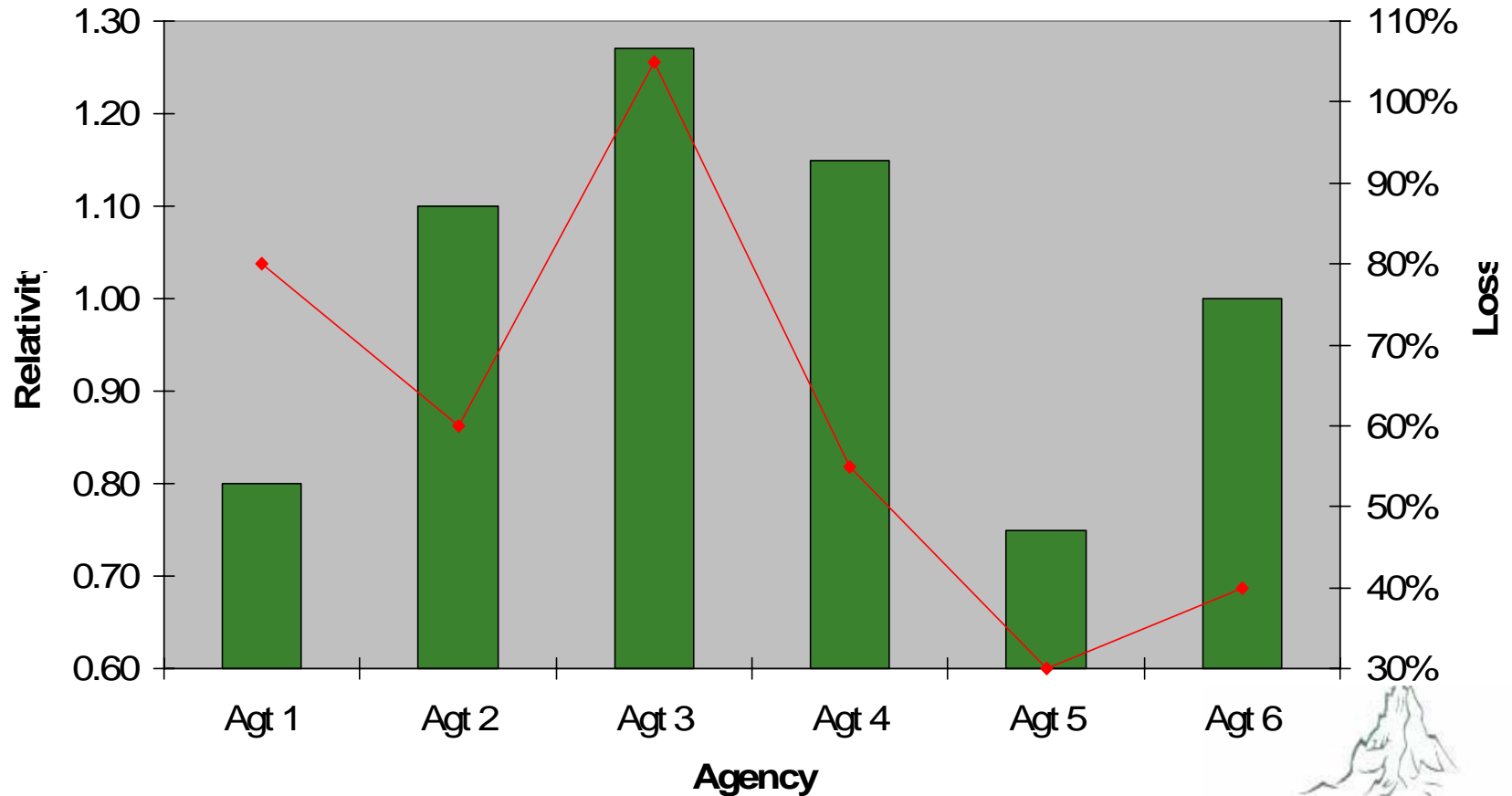
Agency	Premium	Loss Ratio
Blacksburg	34,677,906	60.0%
Blue Ash	15,184,886	47.4%
Brownsville	20,735,771	68.7%
Clear Creek	24,298,942	51.2%
Grayston	16,024,517	69.4%
Greenfield	22,066,282	61.7%
Mauveton	15,652,662	58.6%
Purple Mountain	4,503,152	62.1%
Redding	24,997,314	70.3%
Scarlet Heights	27,300,307	63.3%
White Oak	38,828,032	77.2%
Yellowstone	31,195,807	67.8%
Grand Total	275,465,577	64.4%



The Goal

- 1) Review agency experience to assist in evaluating:**
 - ❑ **Commission scales**
 - ❑ **Contingent commissions**
 - ❑ **Agency retention/rehabilitation**
- 2) Reflect differences in books of business (class, territory) that exist between agencies**
- 3) What Agencies do you want to reunderwrite? What Lines of Business?**

Agency U/W Relativities



■ Relativity ◆ Loss Ratio

Profiles by Agency Focus

