



Concurrent Session 1: Negative Frequency Trend

CAS/CARe Seminar, Bermuda, June 6-7, 2013
John Buchanan, ISO – Excess and Reinsurance

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Concurrent Session 1

Negative Frequency Trend? And where are we going...

In analyzing the various components of the underwriting cycle, a spotlight has been shone on the impact of frequency changes over the last dozen years. Apparently some significant frequency reductions may help solve the puzzle in some lines of relatively good overall results in spite of overall price reductions and not keeping up with steadily increasing average severities over the last decade. This session will survey the level of frequency reductions in various lines of business, investigate the difference between reductions in nuisance claims and large claims, peel apart the components driving the reductions, and attempt to assess which of those components could turn around either slowly or abruptly under changing circumstances.

Moderator / Panelist:

John Buchanan, ISO – Principal, Reinsurance Division

Panelists:

Jill Cecchini, Vice President, Scor Reinsurance

Brian Alvers, Senior Managing Director, Aon Benfield

Agenda – CS 1

Negative Frequency Trend...and where are we going...

- **Overview – John 5 mins**
 - Framing the presentations
- **Negative Frequency Trends! – Brian 20 mins**
 - Modeling the underwriting cycle
 - More US indications – PAu, WC, MPL, Management Liability, Property
 - Some International indications
- **Negative Frequency Trends? – Jill 20 mins**
 - Survey - GL, Auto, Property
 - Reasons for decline
 - Future observations
- **Negative Frequency Trends: Further Investigation – John 20 mins**
 - Investigating frequency trends by size-of-loss
 - Assessing frequency trend impact components
 - Emerging issues
- **QA 10 mins**

Framing Today's Presentations

Negative Frequency Trend (CS 1)

	1	2	3	4	5	6	7		
	Trends								
	Ground Up			Excess		Loss Dev't Factors			
	Severity	Freq	Exposure	Severity	Freq	Ground Up	Excess		
 Property		CS1-JC,BA							
Casualty	CS1-JB	CS1-JC,BA,JB		CS1-JB	CS1-JB				
Specialty		CS1-BA							
	8	9	10	11	12	13	14	15	
	Rate Changes		Ground-Up Loss Costs	Excess Loss Factors	ALAE	Region/ Hazard/ Subline	Layer Experience/ Exposure	Emergence Testing	
	Primary	Reinsurance							
 Property									
Casualty						CS1-JC,JB			
Specialty									
	16	17	18	19	20	21	22	23	
	External Forces	Loss Ratios			Aggregate Distribution	Industry Macro Application	LOB Redund/Def/ Correlations	Where in the Cycle?	
		Primary	Reinsurers	Volatility					
 Property	CS1-JC								
Casualty	CS1-JC,BA,JB							CS1-BA	
Specialty	CS1-BA,JB								



Concurrent Session 1: Negative Frequency Trend Further Investigation

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Agenda – CS 1

Negative Frequency Trend...Further Investigation

- **Importance of getting it right**
 - The two major company killers: US Liability and US Catastrophe exposure*
 - An accumulation of many years of getting it wrong is an avalanche of red ink, or worse
- **Investigating frequency trends by size-of-loss**
 - Overview and difficulty in assessing
 - Two sample ground-up vs. excess frequency calculations
 - Single maturity (ground-up and 50k)
 - Triangulated (ground-up vs. various excess thresholds)
 - Comparing incoming case loads to large settled verdicts and settlements
- **Assessing frequency trend impact components**
 - Frequency trend assessment matrix
 - Two sample impact analyses
 - Personal Auto
 - MPL
- **Emerging issues**

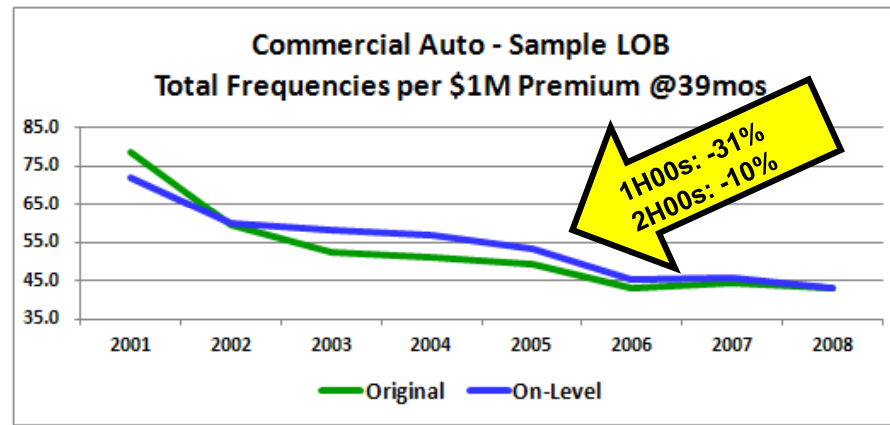
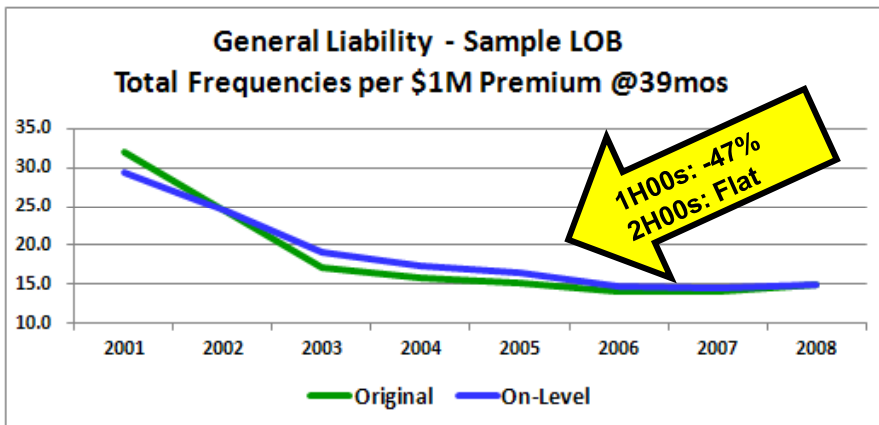
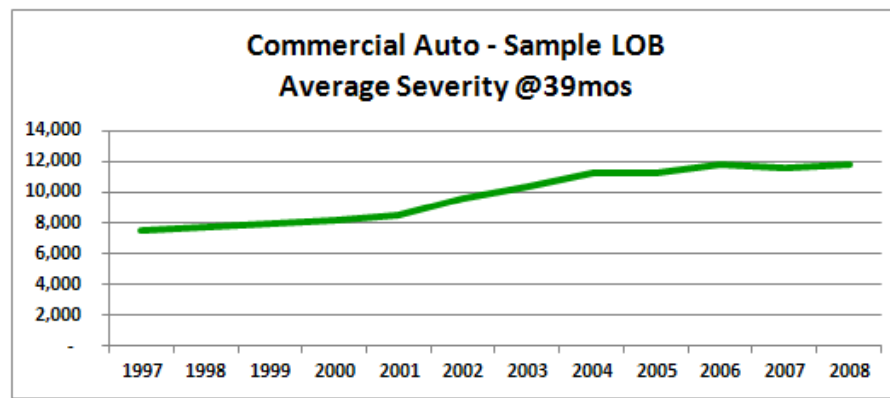
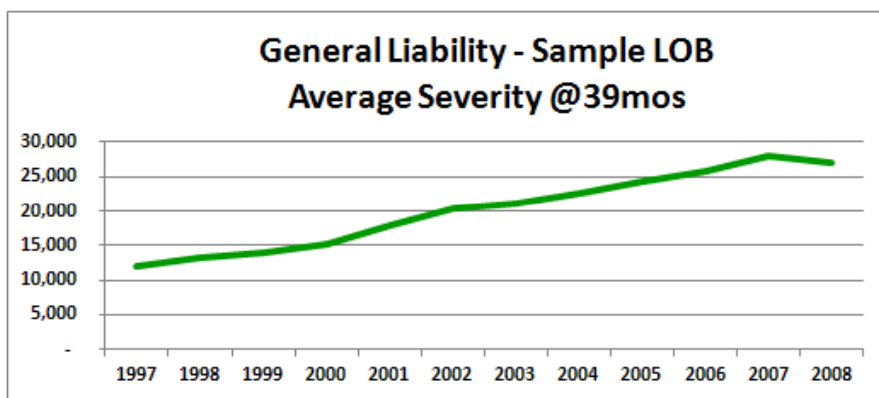
* Jeffrey Dollinger – *International Reinsurance: The Education of an American Actuary* – CAGNY May 2013

Size-of-Loss Trend Overview

- **Review components underlying profitability and the underwriting cycle**
 - Rate changes generally down, or not keeping up with severity trends
 - Loss severity trends relatively steady
 - Yet, profitability levels generally maintained
- **Spotlight shown on impact of frequency changes over the last dozen years to help solve the puzzle**
 - Evaluate differential impact on primary vs. reinsurance companies
 - Nuisance vs. large claims
 - Individual frequency driver impact assessments
- **Difficulty in estimating excess severity and frequency trends**
 - Brief recap last year (*covered in CARE Intermediate Track*)
- **Watching out for reversals – slowly or abruptly**
 - Early warning signals – report year indications
 - Emergence testing



Sample Ground-Up Severity and Frequency Trends



Source: ISO Size-of-Loss Matrix, including MarketWatch on-level factors

Size-of-Loss Matrix – Sample Exhibit

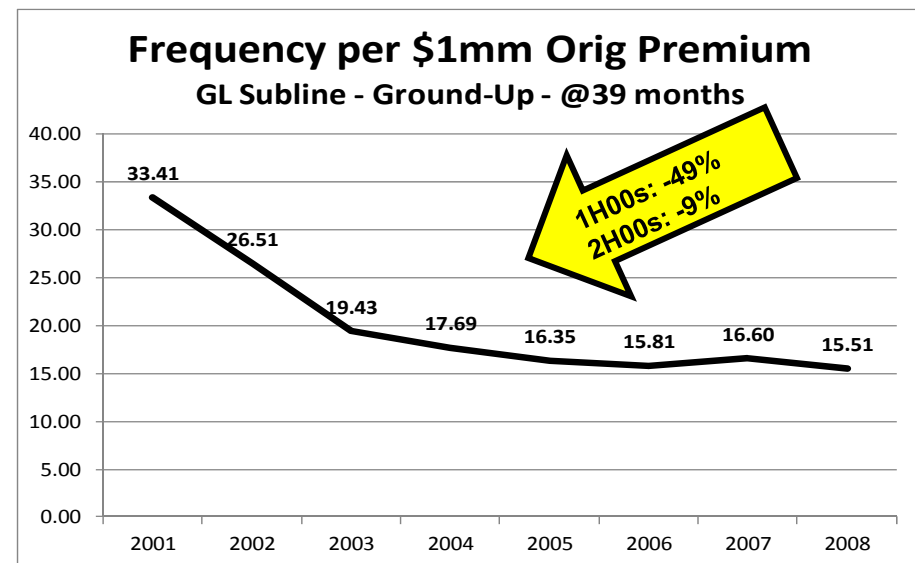
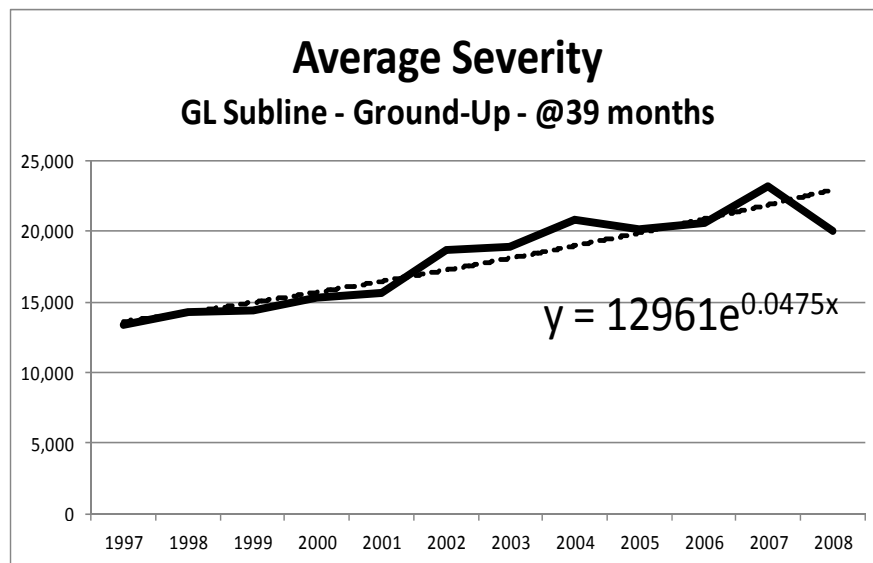
GL Subline 1
Distribution of losses at 39 month maturity

SIZE OF LOSS		ACCIDENT YEAR											
RANGE	STATISTIC	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
0-0	INCURRED INDEMNITY	0	0	0	0	0	0	0	0	0	0	0	0
0-0	INCURRED ALAE	13,599,439	14,158,465	12,414,728	8,791,334	11,037,136	8,023,261	6,547,579	5,076,017	6,075,653	5,356,090	4,923,851	5,369,093
0-0	OCCURRENCE COUNT	4,768	3,747	3,311	2,401	2,210	1,606	1,528	1,371	1,335	1,114	1,232	1,252
1-100	INCURRED INDEMNITY	66,507	63,835	56,970	46,597	33,673	24,798	21,410	16,465	14,138	11,914	12,217	11,498
1-100	INCURRED ALAE	1,467,737	1,198,849	523,916	1,198,414	313,721	633,757	115,203	1,313,583	764,478	574,781	1,125,642	1,762,505
1-100	OCCURRENCE COUNT	1,239	1,128	1,039	850	654	508	420	324	302	241	239	222
5001-10000	INCURRED INDEMNITY	15,974,875	15,713,670	15,011,338	11,764,726	10,455,496	8,860,116	7,682,813	7,348,043	7,277,050	6,950,938	7,393,069	6,691,362
5001-10000	INCURRED ALAE	4,789,623	4,063,309	3,710,736	3,226,484	2,644,978	2,330,274	1,976,995	2,098,134	2,063,173	1,693,002	1,721,988	1,278,192
5001-10000	OCCURRENCE COUNT	2,081	2,061	1,972	1,564	1,387	1,168	1,021	980	963	935	976	893
10001-25000	INCURRED INDEMNITY	30,779,863	31,692,836	30,170,836	23,567,139	21,077,007	17,090,694	15,505,714	15,140,991	12,621,825	13,596,886	13,823,634	13,118,620
10001-25000	INCURRED ALAE	7,763,591	13,959,823	7,299,818	6,179,151	5,383,201	4,498,981	4,022,560	4,153,983	3,428,923	3,802,923	3,938,490	3,120,559
10001-25000	OCCURRENCE COUNT	1,781	1,833	1,748	1,377	1,254	1,004	895	891	740	806	807	769
25001-50000	INCURRED INDEMNITY	33,754,277	34,322,870	34,299,041	26,202,898	22,236,604	19,413,193	19,754,037	17,340,592	15,777,674	16,543,418	15,508,850	15,185,790
25001-50000	INCURRED ALAE	7,856,317	8,299,210	6,852,323	5,740,062	5,074,411	6,228,246	4,803,747	3,906,266	4,260,656	4,119,995	3,208,286	3,532,573
25001-50000	OCCURRENCE COUNT	885	904	891	711	601	507	522	464	416	436	409	405
50001-100000	INCURRED INDEMNITY	38,244,077	39,108,844	42,476,479	32,364,620	27,450,038	27,974,064	23,593,009	25,298,980	24,703,981	20,104,905	21,646,911	21,002,152
50001-100000	INCURRED ALAE	7,298,334	8,150,441	6,790,922	6,438,844	5,524,548	6,909,154	4,705,091	6,301,545	4,453,345	3,613,932	6,168,463	4,129,669
50001-100000	OCCURRENCE COUNT	506	519	562	435	362	371	314	332	331	273	286	278
100001-250000	INCURRED INDEMNITY	47,620,222	50,030,641	54,116,170	42,298,192	35,032,281	37,401,777	32,357,081	35,761,489	30,114,004	29,307,715	36,557,085	29,182,200
100001-250000	INCURRED ALAE	8,241,131	9,952,714	8,020,849	6,412,332	6,104,697	9,191,973	5,411,382	7,666,665	5,229,612	4,355,517	5,965,216	5,395,627
100001-250000	OCCURRENCE COUNT	292	314	336	265	212	224	199	214	183	175	220	181
250001-500000	INCURRED INDEMNITY	44,266,748	46,649,277	40,354,874	38,504,019	31,740,584	34,694,423	28,371,650	26,136,233	26,554,976	29,580,238	27,795,072	24,589,379
250001-500000	INCURRED ALAE	6,375,440	6,921,522	4,569,491	5,366,274	6,171,096	5,044,736	5,590,589	2,438,613	3,024,513	4,054,341	3,903,097	3,478,120
250001-500000	OCCURRENCE COUNT	121	125	109	104	96	93	76	71	70	80	76	65
500001-1000000	INCURRED INDEMNITY	55,847,358	57,937,742	57,888,577	53,635,885	43,389,281	38,817,189	42,475,804	50,056,769	31,610,534	32,704,720	47,810,336	34,472,022
500001-1000000	INCURRED ALAE	4,907,367	8,193,414	6,224,802	6,409,820	4,577,918	3,704,574	3,825,920	3,497,827	2,695,174	3,601,330	8,775,713	4,894,130
500001-1000000	OCCURRENCE COUNT	69	68	71	67	52	49	50	60	40	40	59	41
>1000000	INCURRED INDEMNITY	17,055,135	10,303,726	9,452,502	17,385,921	7,915,396	6,852,310		7,691,451	15,081,532	6,720,005	7,684,356	3,129,176
>1000000	INCURRED ALAE	238,954	434,398	283,456	880,296	2,802,675	204,494		130,292	1,850,338	1,511,107	837,331	465,342
>1000000	OCCURRENCE COUNT	9	6	5	11	5	5		6	8	6	6	3
1,478,916,571	Total Indemnity	306,549,696	309,129,577	306,013,085	264,484,739	214,412,316	203,542,314	180,631,697	195,650,189	173,943,567	165,275,287	188,395,183	157,066,018
330,831,702	Total ALAE	68,126,331	80,306,611	61,341,379	53,859,461	52,258,682	49,259,223	39,429,574	39,928,490	36,038,372	34,504,967	43,897,691	35,514,703
93,495	Occurrence Count	28,118	27,207	25,630	20,763	17,127	13,576	11,687	11,305	10,453	9,711	10,037	9,599
4,742,032,061	EARNED PREMIUM					512,637,147	512,069,014	601,592,626	638,906,992	639,194,023	614,239,742	604,657,222	618,735,296
38.2%	To Date Ground-Up LR					52.0%	49.4%	36.6%	36.9%	32.9%	32.5%	38.4%	31.1%
2001-2008													

Illustration of Excess Trend Issue

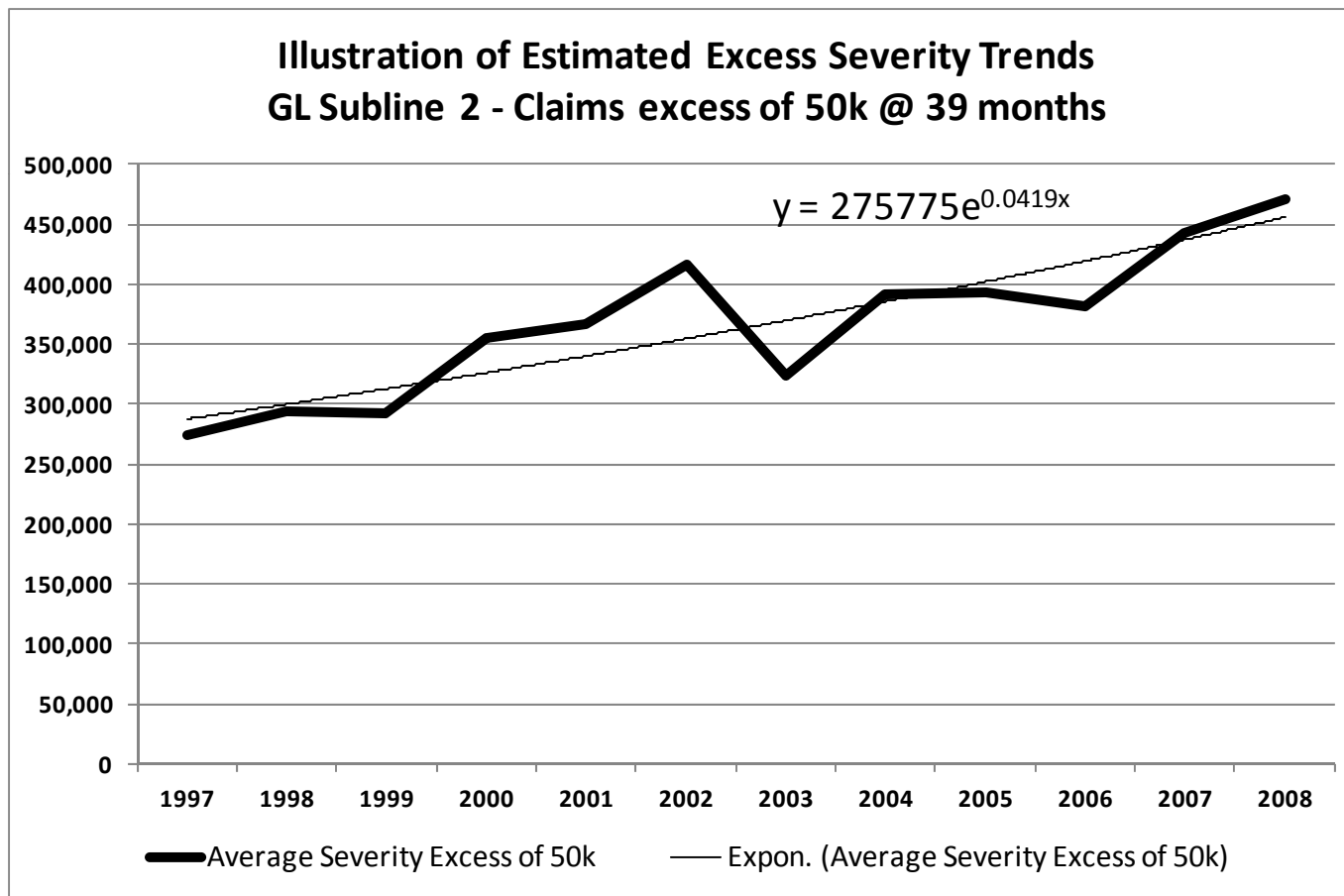
Ground-Up Severity and Frequency Trends - Unadjusted

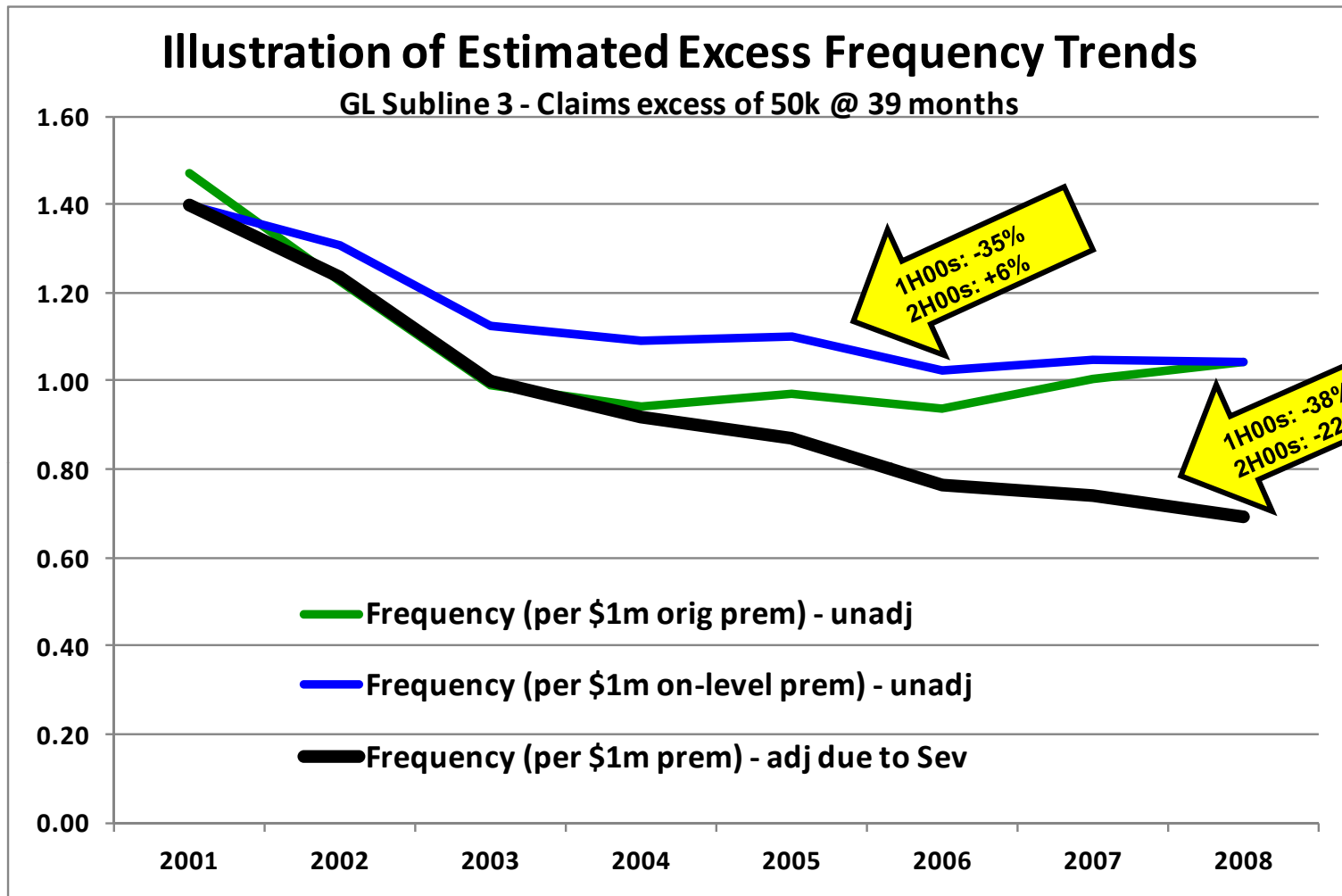
GL Subline #1 (6.4%) - @39mo	2001	2002	2003	2004	2005	2006	2007	2008	2001-2008
Incurring Indemnity	214,412,316	203,542,314	180,631,697	195,650,189	173,943,567	165,275,287	188,395,183	157,066,018	1,478,916,571
Incurring ALAE	52,258,682	49,259,223	39,429,574	39,928,490	36,038,372	34,504,967	43,897,691	35,514,703	330,831,702
Occurrence Count	17,127	13,576	11,687	11,305	10,453	9,711	10,037	9,599	93,495
Earned Premium - Raw	512,637,147	512,069,014	601,592,626	638,906,992	639,194,023	614,239,742	604,657,222	618,735,296	4,742,032,061
Indicated LR - unadjusted	0.52	0.49	0.37	0.37	0.33	0.33	0.38	0.31	0.38
Frequency (per \$1m orig prem) - unadj	33.41	26.51	19.43	17.69	16.35	15.81	16.60	15.51	19.72
Average Severity	15,570	18,621	18,830	20,838	20,088	20,573	23,144	20,063	19,357



Illustrative Usage of Data

Excess Severity Trends – Unadjusted





- **Using Size of Loss Matrix data, including the below adjustments**
 - Adjust Earned Premiums to Current Level (using MarketWatch)
 - Include severity trend on excess counts (to counter the effect of severity on claims close to the threshold)
- **Using data to evaluate:**
 - are excess and reinsurers participating in the favorable frequency decline experienced in the 2000's.
 - Are frequency reductions affecting small claims only, or are larger claims being reduced as well (or even more than small claims) due to additional safety measures, etc.

Sample Frequency Projections Ground-up Claims

Major Class **1**
 Loss Min -
 Loss Max **>1,000,000**
 Loss Type **OCCURENCE COUNT**

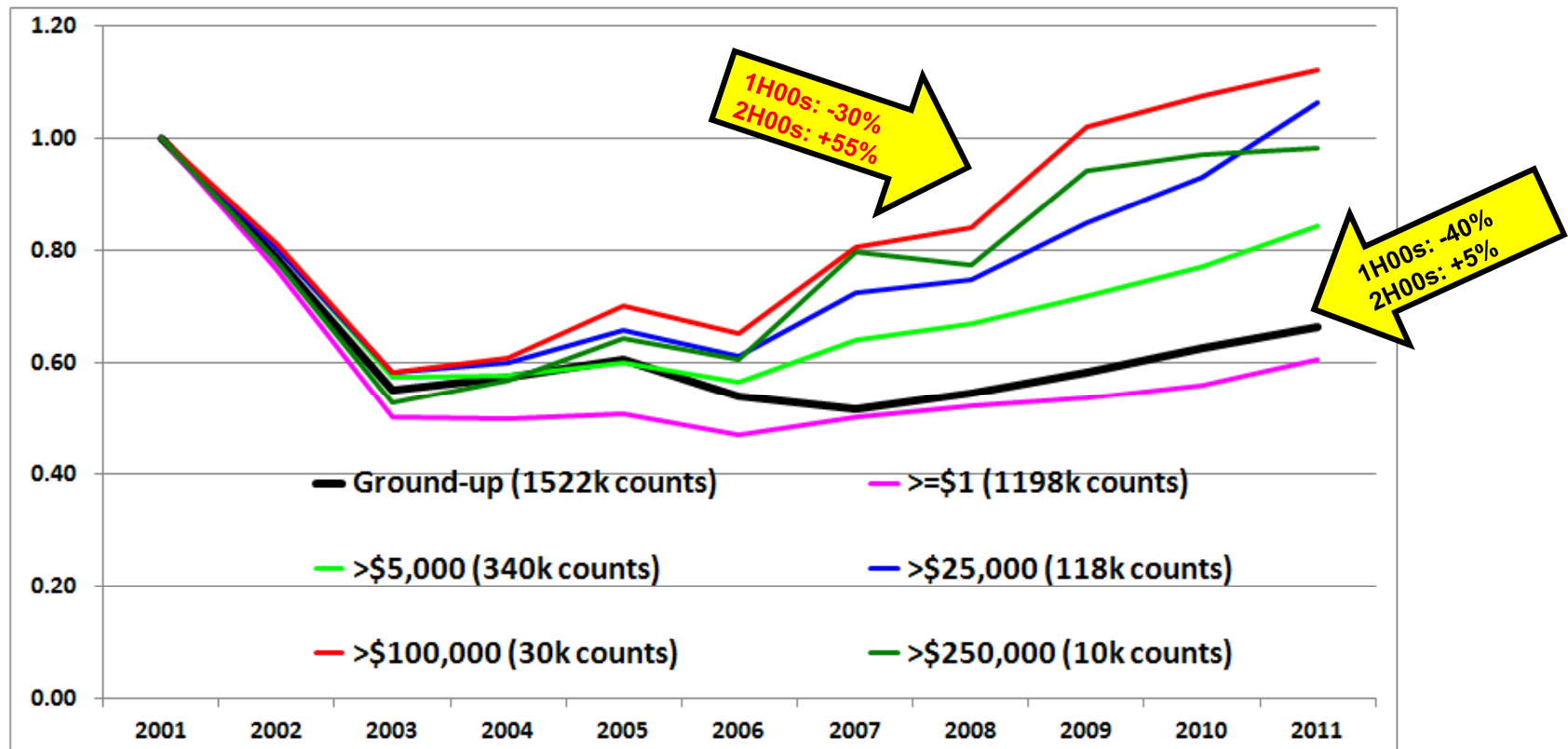
Line of Business Market
GL Owners, Landlords, and Tenants

Accident Year	12	24	36	48	60	72	84	96	108	120	
AY 1997	125,165	143,738	155,246	161,587	165,297	167,220	168,158	168,602	168,556	168,674	
AY 1998	112,941	134,001	141,703	146,980	149,458	151,044	151,551	151,649	151,918	152,171	
AY 1999	113,165	133,106	142,433	147,041	149,127	150,052	150,200	150,622	150,913	151,205	
AY 2000	99,980	117,781	124,052	126,938	128,406	128,786	129,147	129,319	129,482	129,636	
AY 2001	89,928	100,622	104,506	107,401	108,387	109,059	109,360	109,582	109,697	109,806	
AY 2002	77,231	83,594	88,789	91,777	93,186	93,919	94,272	94,464	94,651	94,769	
AY 2003	68,459	75,420	80,212	83,862	85,958	86,690	87,858	88,294	88,575		
AY 2004	69,355	74,524	79,428	83,447	85,371	87,894	88,692	89,107			
AY 2005	67,845	73,886	79,554	84,322	88,043	89,108	89,773				
AY 2006	63,269	67,728	72,677	76,855	78,797	79,696					
AY 2007	65,400	69,981	72,705	73,741	73,945						
AY 2008	64,622	70,366	71,903	73,077							
AY 2009	68,286	72,225	75,013								
AY 2010	70,494	75,757									
AY 2011	70,597										
	1,439,397	1,521,801									
To Date	70,597	75,757	75,013	73,077	73,945	79,696	89,773	89,107	88,575	94,769	109,806
Ult Incd	89,980	86,355	80,777	75,949	75,448	80,502	90,237	89,348	88,690	94,769	109,806
Ult Prem	2,430,677,062	2,475,577,527	2,483,447,255	2,500,200,062	2,618,499,021	2,679,750,544	2,674,564,574	2,794,520,191	2,883,074,690	2,164,885,049	1,965,971,435
Indic Freq/IM EP	37.02	34.88	32.53	30.38	28.81	30.04	33.74	31.97	30.76	43.78	55.85
Freq relative to 2001	0.66	0.62	0.58	0.54	0.52	0.54	0.60	0.57	0.55	0.78	1.00

Source: ISO Size-of-Loss Matrix – premiums and frequencies developed to ultimate using all year-volume weighted averages

Various Excess Frequency Analyses

Sample Ground-up and Excess Frequencies - **Unadjusted**



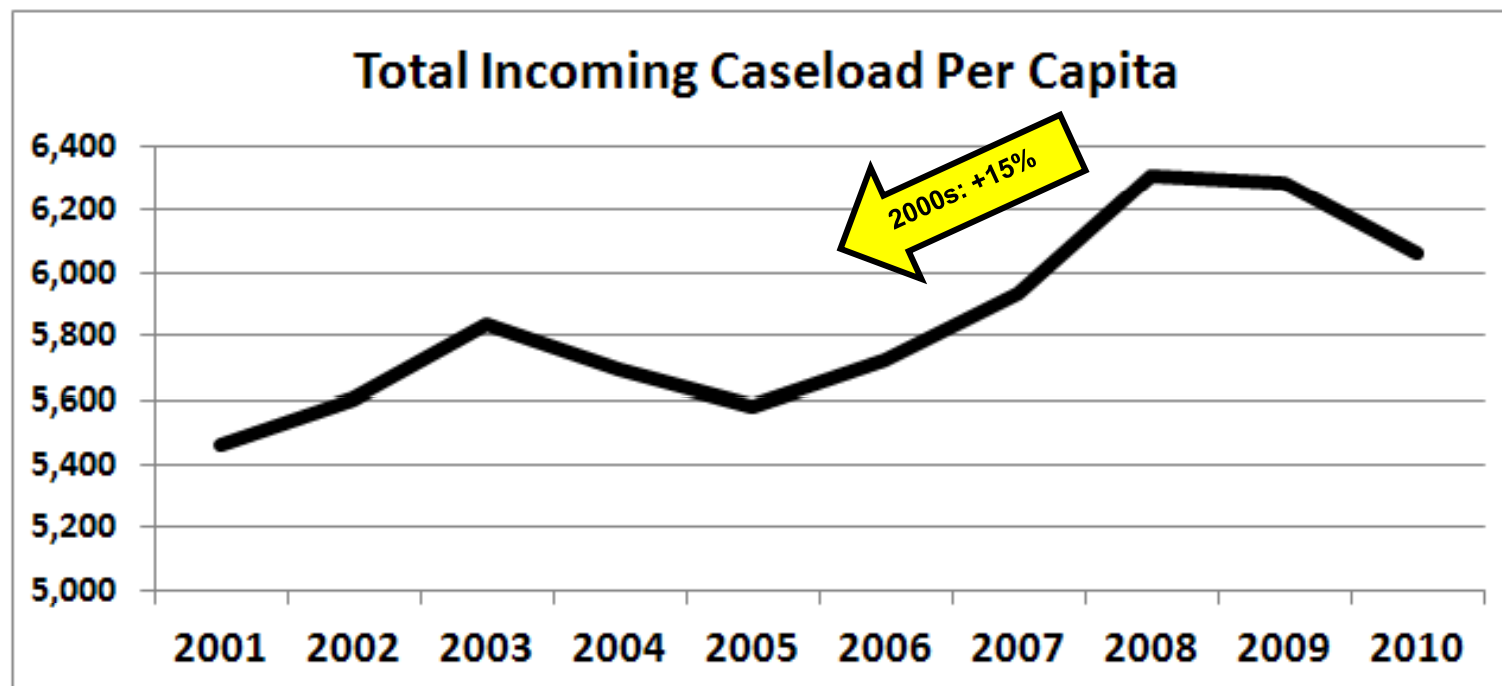
Source: ISO Size of Loss Matrix (OL&T - 550 companies - \$22.2B)

Using all-year volume weighted averages and no development beyond 120 months

NB: Frequency per \$1M SP relativities do NOT include adjustment for premium on-leveling, or the effect of severity trend on claims near the threshold

Various Excess Frequency Analyses

Total Incoming Caseloads - NCSC

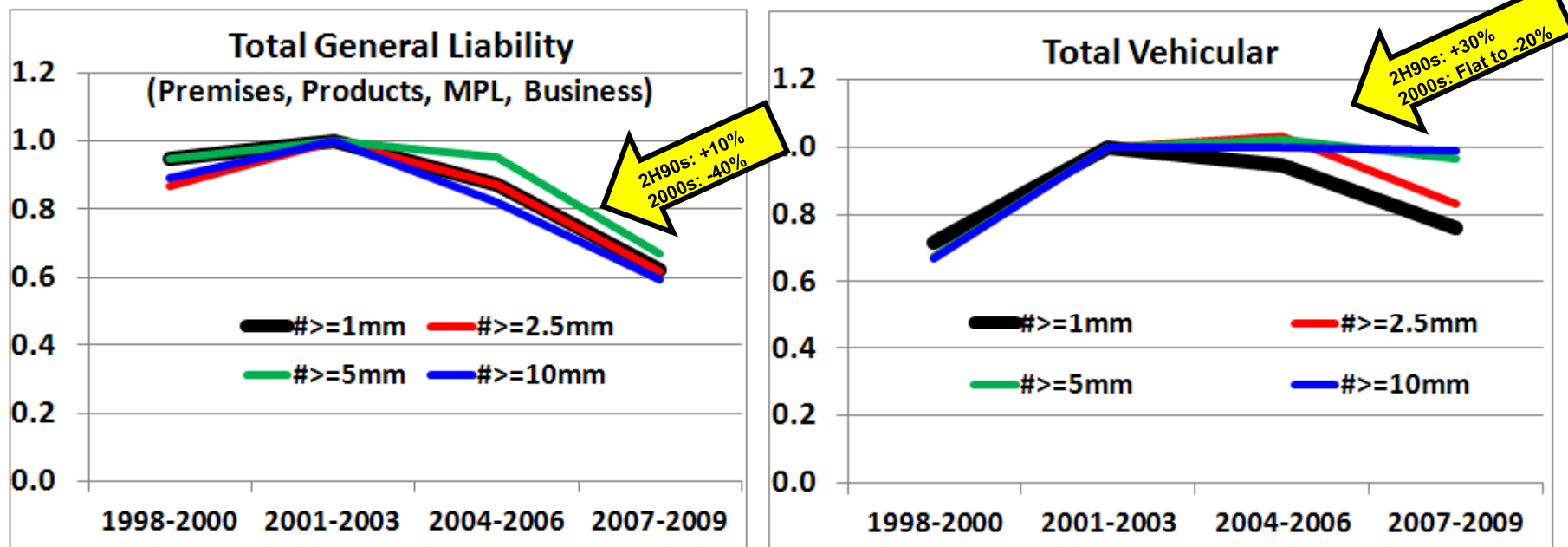


Source: National Center for State Courts - Kathryn Holt - as of 9/24/2012 (courtesy Dave Clark)
 Total Incoming Civil Caseloads per 100,000 Population, All States, 2001-2010

Various Excess Frequency Analyses

Total Large Verdicts and Settlements by Closed Year - JVR

Total Settled Cases (Verdicts and Settlements) Relativities by Closed Year



Source: Jury Verdict Research - Jennifer Shannon - verdict and settlements through 8/2012 by closed year (base years = 2001-03)

Total # settled cases >1M all states between 1998 and current: General Liability = 7,219, Vehicular = 3,395

Frequency Trend Assessment Matrix – Overview and Steps

Reconciling Expected Impacts on Historical Trend Indications

Overview: Apply knowledge from internal and external sources

- Assess qualitative impacts affecting individual lines of business
- Evaluate impacts on combinations of lines under an ERM framework; historical and emerging

1. Start with a survey list of potential historical issues or topics

- e.g. impact of seat belt laws for Personal Auto or MPL under various time frames

2. Assess whether each item would have a positive or negative impact

- e.g. expected to reduce (positive) or increase (negative) the frequency trend, no impact or unknown

3. Attempt to quantify impact of each item

- Low, medium, high, or unknown

4. Reconcile various impact items, direction and magnitude, on historical frequency trend indications

- Eyeball axiom – do the two visuals line up across the time periods included?
- Perhaps more rigorous trend analysis confidence level tests can be applied

5. Do the same for:

- Across line impacts under ERM (e.g. economy, climate change, etc.)
- Severity impacts and other items in Benchmark Assessment Matrix
- Future emerging issues

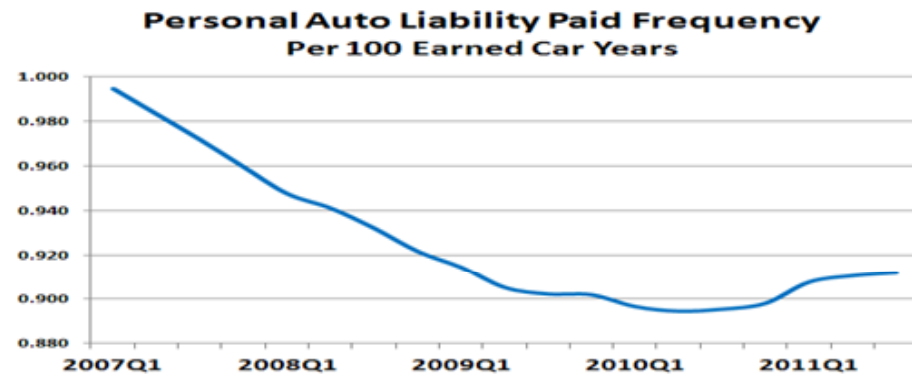
Frequency Trend Assessment Matrix

Impact Illustration #1 – Personal Auto Cycle

ISSUE/TOPIC		Personal Auto - Total				
		2H1990s	1H2000s	2H2000s	2010-13	FUTURE
Historical Perspective	Seat Belt Laws	M				✓
	Seat Belt Usage		L	L		✓
	Airbags Laws/Technology	L	M	M	L	
	Automobile Design	L	L	L		
	Roadway Design	L	L	L		
	Electronic Stability Control		L	H	L	
	Vehicle Type (Unequal Size)		L	L	L	
	Bumper Height		✓	✓	✓	
	Graduated Licensing (Teenagers)		M	L		
	Performance (more HP)		L	L	L	
	Distracted Driving (use of Cell Phones, etc.)		L	M	M	
	Economy (good mean more driving, vice-versa)	✓	L	M	L	
	Miles Driven (Price of Gasoline)			L	L	
	Climate (severe weather change?)			✓	✓	✓
	Tort Reform	✓	✓	✓	✓	
	Building Code Regulation/Construction					

Impact Color Keys:
Positive (Lower Frequency)
Negative (Higher Frequency)
Expected No Impact
Blank = N/A
✓ = Some impact expected (TBD)

Impact Levels:
H = High
M = Medium
L = Low

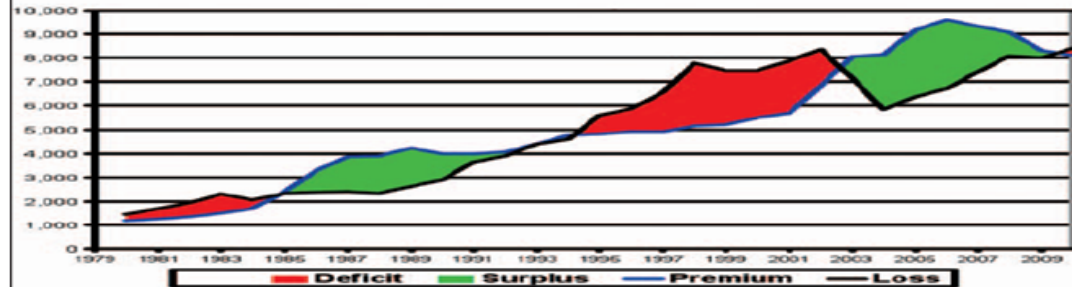


Frequency Trend Assessment Matrix

Impact Illustration #2 – MPL Cycle Components

ISSUE/TOPIC		PROFESSIONAL LINES - MPL														
		MPL - Total					MPL - Doc					MPL - Hosp				
		2H 1990s	1H 2000s	2H 2000s	2010-13	Future	2H 1990s	1H 2000s	2H 2000s	2010-13	Future	2H 1990s	1H 2000s	2H 2000s	2010-13	Future
Historical Perspective	Advancements in Risk Management / Patient Safety															
	- Advances in anesthesiology, ER triage, symptom check lists, etc.															
	- Apology Movement / I'm Sorry Legislation															
	- EMR / Computerized Phys Order Entry															
	Defensive Medicine															
	Economic Considerations															
	Legal Environment Changes															
	- Cost effectiveness to bring suit															
	Social / Ideology shifts (more/less conservative)															
	- Attorney general / judge appointments															
	- Heightened media coverage															
	Tort Reform enactment/erosion															
	Supply / Demand shifts															
	- Delivery System Shift (provider Phys/Hosp consolidation)															
	- Patient demographic shift (age, diabetes, obesity, etc.)															
- Patient demand increase (new insureds)																
- Physician supply shortage																

Impact Color Keys:
Positive (Lower Frequency)
Negative (Higher Frequency)
No Impact/Unknown
Blank = N/A
✓ = Some impact expected (TBD)



Emerging Issues - What's Hot?

- Survey of ISO's Emerging Issues Panel members
 - Respondents' top issues:

Climate Change	Food-related issues
Cyber security	Hydraulic fracturing
Counterfeit products	Nanotechnology
Hazardous chemicals/materials	Social media liability

- An insurer's top issues may depend on their size and market

Source: Jeff DeTurrís – ISO Emerging Issues Panel and Portal

Emerging Issues – Expanded Topics

- Alternative energy
- Artificial intelligence
- Class action lawsuits
- Climate change
- Cyber security
- Defective/counterfeit products
- Demographic changes
- Driver/vehicle issues
 - CAFE standards, self-driving cars
- Drywall
- Economic downturn
- E-waste
- Food-related issues
- Genetically modified organisms
- Green buildings
- Hydraulic Fracturing (fracking)
- Hazardous chemicals/products
- Litigation financing
- Medical/recreational marijuana
- Nanotechnology
- Social media liability
- Space weather
- Supply chain vulnerability
- Water quality/scarcity

Emerging Issues - Illustration

Assessing Impact by Line of Business Framework

	STANDARD CASUALTY								PROFESSIONAL LINES					PROPERTY			OTHER								
	PA - Total	CAu - Total	CAu - Short Haul	CAu - LHT	CAu - PPT	GL - Total	GL - PremOps	GL - Prod	MPL - Total	MPL - Doc	MPL - Hosp	PLOTM - Total	PLOTM - E&O	PLOTM - D&O	PLOTM - LPL	PLOTM - All Other	HO - Total	CP - Fire	CP - Wind	WC	WC Cat	Crop	Aviation	Marine	A&H
Alternative Energy																									
Artificial Intelligence																									
Autonomous Vehicles																									
Class Action Lawsuits																									
Climate Change																									
Cyber Security																									
Defective/Counterfeit Products																									
Demographic Changes																									
Distracted Drivers																									
Distracted Driving Laws																									
Driver/Vehicle Issues																									
Drywall																									
Effects of the Economic Downturn																									
E-Waste																									
Food-Related Issues																									
Genetically Modified Organisms																									
Green Buildings																									
Government Regulation																									
Government Debt Levels																									
Hazardous Chemicals/Products																									
Hydraulic Fracturing (Fracking)		✓	✓	✓		M	H	L									✓	✓							
Litigation Financing																									
Medical/Recreational Marijuana																									
Nanotechnology																									
Reputational Risk																									
Social Media Liability																									
Solar Weather																									
Supply Chain Vulnerability																									
Water Quality/Scarcity																									

Emerging Issues

Impact Color Keys:
Positive (Lower Frequency)
Negative (Higher Frequency)
No Impact/Unknown
Blank = N/A
✓ = Some impact expected (TBD)

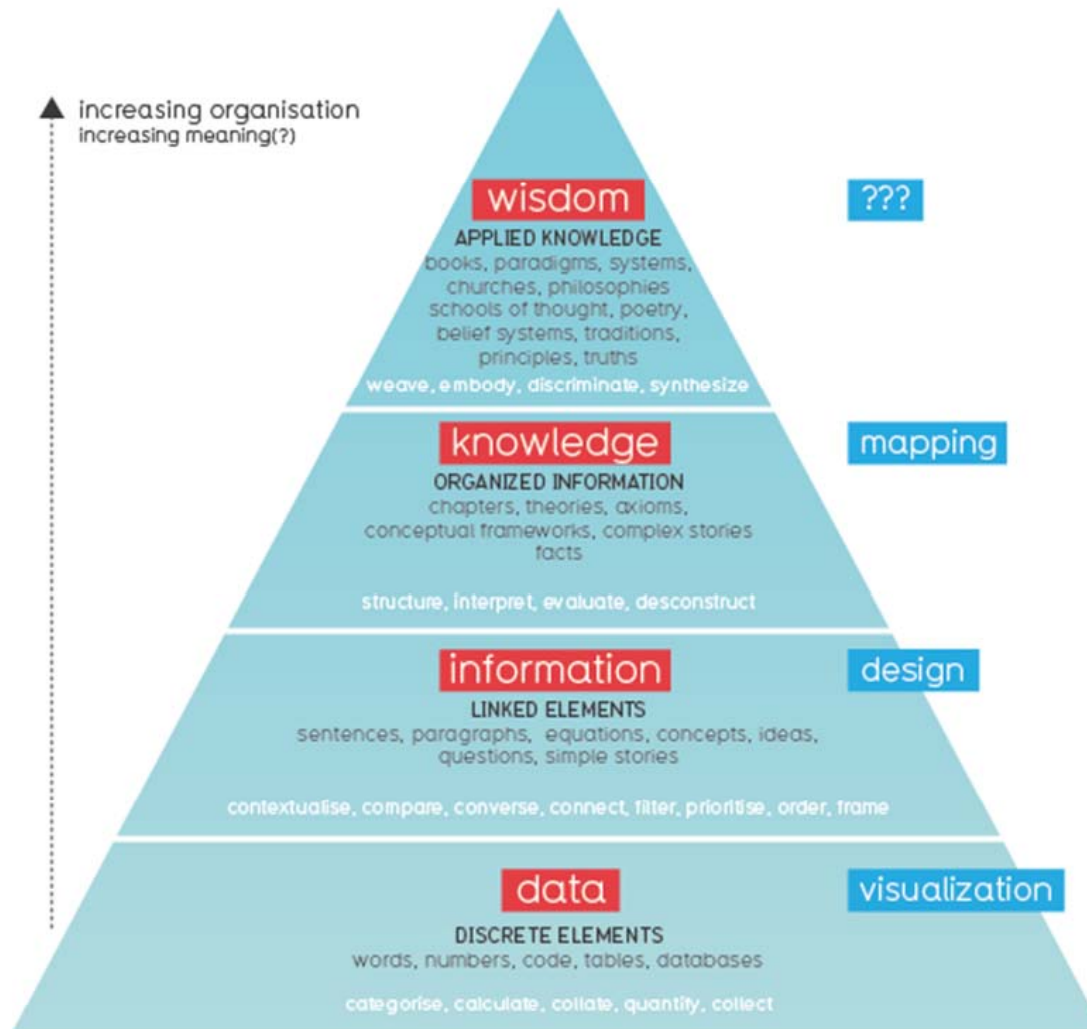
Yellow box = perhaps cover at CARe Bermuda session

Impact Levels:
H = High
M = Medium
L = Low



Appendix

Benchmarking: Data to Wisdom Conversion



David McCandless // v 0.1 // work in progress
InformationIsBeautiful.net

Overview: Comparison of ISO Excess Loss Development and Trend Sources

	Excess Layer Loss Development Manuals	Size-of-Loss Matrix	Size-of-Loss Utility	UXS
Release	First released 1998; every other year since	First released Fall 2012; next release Summer 2013	First release expected Fall 2013	First released 2005; most recent Spring 2013
Type of Data	Aggregated loss and claim count triangles - 20 years	Aggregated loss and claim count triangles, associated premiums and on-level factors	Individual claims/ histories (masked), associated aggregated premiums and on-level factors	Individual claims (masked)
Lines / Classes of Business Covered	GL (PremOps, Prods), CAu, MPL (CM, Occ)	GL (7 sublines, total), CAu (3 sublines, total)	same as SOLM	
Accident Years	Last 20 years	Last 12 years (current)	same as SOLM	
# of Companies	550	600	same as SOLM	
Volume (untrended): Ground-Up >100k * >1M *	<u>GL, CAu, MPL</u> 147.2B (#=13.5M) 60.2B (#=910K) 5.1B (#=16.5K)	<u>GL, CAu</u> 109.1B (#=7.1M) 45.6B (#=139K) 7.5B (#=3.9K)	same as SOLM same as SOLM same as SOLM	10,700 Umbrella / Excess claims
Types of Analyses	Layer Loss Development Factors	Layer Loss Development Factors	Layer Loss Development Factors	
	Excess Severity Trends	Excess Frequency and Severity Trends	Excess Frequency and Severity Trends	
		Line/class profitability	AY vs. RY	
			Claim dispersions	
			Company differentials - F, M, S, VS	
			Excess percentile distributions	

* XSLDM is >= threshold shown

Size of Loss Trend

Empirical Approach - Unadjusted

						"true" trend->	1.080	1.080 [*]	1.100	1.100	
						Clm #	Y1	Y2	Y3	Y4	Y5
Trend Test - Base Case (no exposure growth or freq trend)						35	80.45	86.89	93.84	103.22	113.55
Tot	426	460	497	546	601	34	63.02	68.07	73.51	80.86	88.95
#	35	35	35	35	35	33	49.72	53.69	57.99	63.79	70.17
Avg	12.2	13.1	14.2	15.6	17.2	32	39.49	42.65	46.07	50.67	55.74
check sev chg		1.080	1.080	1.100	1.100	31	31.59	34.12	36.85	40.53	44.59
						30	25.45	27.49	29.68	32.65	35.92
						29	20.64	22.30	24.08	26.49	29.14
"feeder" trend sel		1.000	1.000	1.000	1.000	28	16.86	18.21	19.67	21.64	23.80
Threshold	25.0	25.0	25.0	25.0	25.0	27	13.87	14.98	16.18	17.80	19.58
Tot xs	290	313	338	398	438	26	11.49	12.41	13.40	14.74	16.22
#	6	6	6	7	7	25	9.58	10.35	11.18	12.30	13.53
Avg	48.3	52.2	56.3	56.9	62.6	24	8.05	8.69	9.39	10.33	11.36
indic sev chg		1.080	1.080	1.010	1.100	23	6.81	7.35	7.94	8.74	9.61
						22	5.80	6.26	6.77	7.44	8.19
						21	4.97	5.37	5.80	6.38	7.02
						20	4.30	4.64	5.01	5.51	6.06
On-level SP	1000	1000	1000	1000	1000	19	3.74	4.04	4.36	4.80	5.27
GU Freq	0.0350	0.0350	0.0350	0.0350	0.0350	18	3.27	3.54	3.82	4.20	4.62
XS Freq	0.0060	0.0060	0.0060	0.0070	0.0070	17	2.89	3.12	3.37	3.70	4.07
indic freq chg		1.000	1.000	1.167	1.000	16	2.56	2.77	2.99	3.29	3.62
						15	2.29	2.48	2.68	2.94	3.24
						14	2.07	2.23	2.41	2.65	2.92
GU Burn	0.4258	0.4598	0.4966	0.5463	0.6009	13	1.87	2.02	2.19	2.40	2.64
XS Burn	0.2897	0.3129	0.3379	0.3982	0.4380	12	1.71	1.85	2.00	2.20	2.41
indic pure prem chg		1.080	1.080	1.178	1.100	11	1.57	1.70	1.84	2.02	2.22
						10	1.46	1.57	1.70	1.87	2.06
						9	1.36	1.47	1.59	1.74	1.92
						8	1.28	1.38	1.49	1.64	1.80
						7	1.21	1.30	1.41	1.55	1.70
						6	1.15	1.24	1.34	1.48	1.62
						5	1.10	1.19	1.29	1.41	1.56
						4	1.06	1.15	1.24	1.37	1.50
						3	1.04	1.12	1.21	1.33	1.46
						2	1.01	1.10	1.18	1.30	1.43
						1	1.00	1.08	1.17	1.28	1.41

Source: CArE 6/2012 – IT1 - JBuchanan

Size of Loss Trend Hypothesis Testing – Assuming 6%

Trend Test - Base Case (no exposure growth or freq trend)

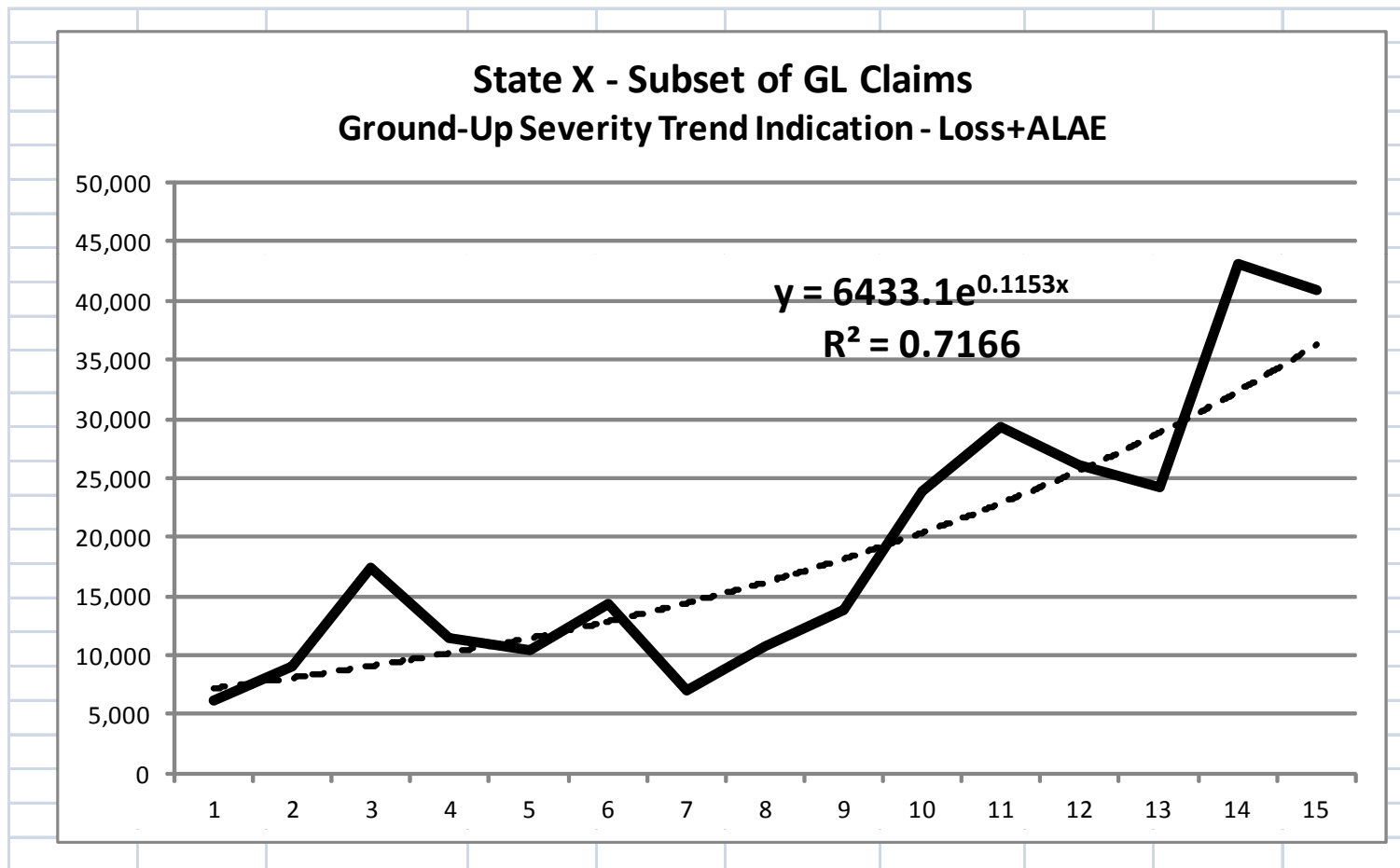
						"true" trend->	1.080	1.080	1.100	1.100	
						Clm #	Y1	Y2	Y3	Y4	Y5
Tot	426	460	497	546	601						
#	35	35	35	35	35						
Avg	12.2	13.1	14.2	15.6	17.2	35	80.45	86.89	93.84	103.22	113.55
check sev chg		1.080	1.080	1.100	1.100	34	63.02	68.07	73.51	80.86	88.95
						33	49.72	53.69	57.99	63.79	70.17
"feeder" trend sel		1.060	1.060	1.060	1.060	32	39.49	42.65	46.07	50.67	55.74
Threshold	25.0	26.5	28.1	29.8	31.6	31	31.59	34.12	36.85	40.53	44.59
Tot xs	290	313	338	372	409	30	25.45	27.49	29.68	32.65	35.92
#	6	6	6	6	6	29	20.64	22.30	24.08	26.49	29.14
Avg	48.3	52.2	56.3	62.0	68.2	28	16.86	18.21	19.67	21.64	23.80
indic sev chg		1.080	1.080	1.100	1.100	27	13.87	14.98	16.18	17.80	19.58
						26	11.49	12.41	13.40	14.74	16.22
On-level SP	1000	1000	1000	1000	1000	25	9.58	10.35	11.18	12.30	13.53
GU Freq	0.0350	0.0350	0.0350	0.0350	0.0350	24	8.05	8.69	9.39	10.33	11.36
XS Freq	0.0060	0.0060	0.0060	0.0060	0.0060	23	6.81	7.35	7.94	8.74	9.61
indic freq chg		1.000	1.000	1.000	1.000						
GU Burn	0.4258	0.4598	0.4966	0.5463	0.6009						
XS Burn	0.2897	0.3129	0.3379	0.3717	0.4089						
indic pure prem chg		1.080	1.080	1.100	1.100						

Size of Loss Trend Hypothesis Testing – Assuming 12%

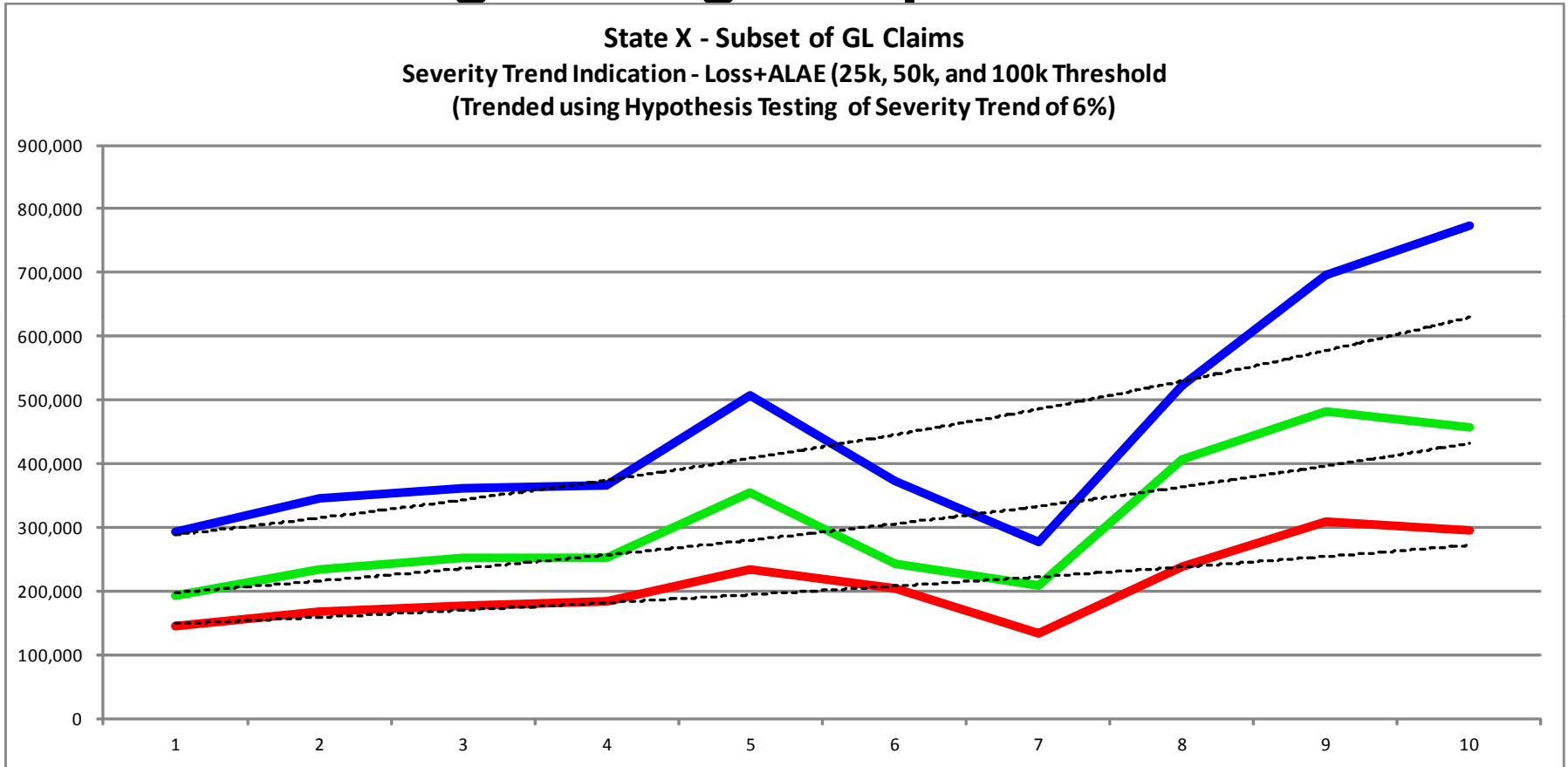
Trend Test - Base Case (no exposure growth or freq trend)

						"true" trend->	1.080	1.080	1.100	1.100	
						Clm #	Y1	Y2	Y3	Y4	Y5
Tot	426	460	497	546	601						
#	35	35	35	35	35						
Avg	12.2	13.1	14.2	15.6	17.2	35	80.45	86.89	93.84	103.22	113.55
check sev chg		1.080	1.080	1.100	1.100	34	63.02	68.07	73.51	80.86	88.95
					1.090	33	49.72	53.69	57.99	63.79	70.17
"feeder" trend sel		1.120	1.120	1.120	1.120	32	39.49	42.65	46.07	50.67	55.74
Threshold	25.0	28.0	31.4	35.1	39.3	31	31.59	34.12	36.85	40.53	44.59
Tot xs	290	285	308	339	373	30	25.45	27.49	29.68	32.65	35.92
#	6	5	5	5	5	29	20.64	22.30	24.08	26.49	29.14
Avg	48.3	57.1	61.7	67.8	74.6	28	16.86	18.21	19.67	21.64	23.80
indic sev chg		1.182	1.080	1.100	1.100	27	13.87	14.98	16.18	17.80	19.58
					1.115	26	11.49	12.41	13.40	14.74	16.22
On-level SP	1000	1000	1000	1000	1000	25	9.58	10.35	11.18	12.30	13.53
GU Freq	0.0350	0.0350	0.0350	0.0350	0.0350	24	8.05	8.69	9.39	10.33	11.36
XS Freq	0.0060	0.0050	0.0050	0.0050	0.0050	23	6.81	7.35	7.94	8.74	9.61
indic freq chg		0.833	1.000	1.000	1.000						
					0.955						
GU Burn	0.4258	0.4598	0.4966	0.5463	0.6009						
XS Burn	0.2897	0.2854	0.3083	0.3391	0.3730						
indic pure prem chg		0.985	1.080	1.100	1.100						
					1.065						

Size of Loss Trend – Ground Up Benchmarking - Using Sample Data



Size of Loss Trend – Empirical Approach Benchmarking - Using Sample Data



Range of Indicated excess trends depending upon data threshold, years selected, and capping amounts: 3.2% to 9.6%

Yr 1-9 - Ltd to 2mm

Threshold	Indic Trend	R^2	#Raw
Ground-Up	11.5%	0.72	14,245
25,000	6.2%	0.39	652
35,000	7.2%	0.46	538
50,000	8.6%	0.51	417
75,000	7.5%	0.40	314
100,000	7.2%	0.41	254

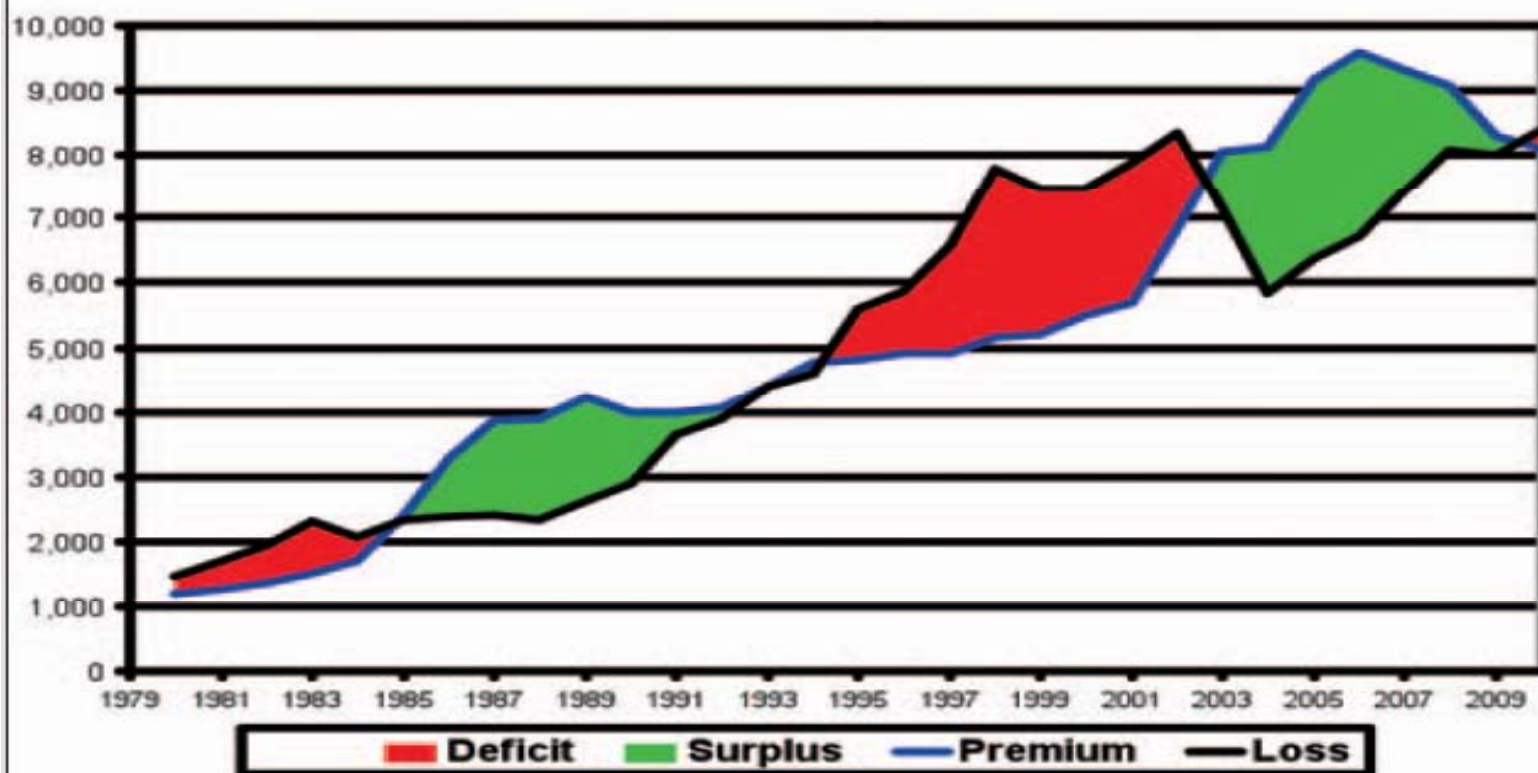
Appendix: Underwriting Cycle

- Hard market vs. Soft market
- Calendar year vs. accident year – **information / emergence lag**
 - Accident year – posted vs. “true” after adjusting for reserves
- Loss ratios, combined ratios, operating ratios
- Forensic analysis of cycle
 - Numerator impacts (loss trends, new plateaus, shock losses)
 - Denominator impacts (rate changes, terms and conditions)
- Relative magnitude of components
 - Losses
 - Rates
 - Reserve adequacy (no impact if able to review “true” AY results)
 - Which is larger impact, losses or rates? Perhaps vary by line
- Hypothesis
 - Soft market bias towards Experience model results
 - Could be implicit by underwriters or management override

Analyzing the Market Cycle

Numerators and Denominators

Figure 4 Historical Look at MPL Industry Underwriting Performance—Accident Year



Source: MPL Sch P @ 12/31/2010 by Rich Lino - Oliver Wyman
 AY reported results including IBNR reported as of December 31, 2010 (or 9 years after AY, if earlier)
 AY estimates reflect investment yield of 0.5% above 5-year US Treasury Rate
 Actual posted results through 12/31/2010

Source: *Physician Insurer*, Fourth Quarter 2011, a publication of
 the Physician Insurers Association of America; J. Buchanan pg. 33

Emergence Lag – Impact of Wrong Signals

Figure 1 Underwriting Cycle – Accident Year (AY) vs. Calendar Year (CY)

Apparent vs. Actual Market Signals – Operating Results

Sch P Year	CY	AY @2010	CY vs. AY Difference	"Breakeven"	"Apparent" Market	"Actual" Market
1980	100%	121%	21.7%	95.0%	Transitional	Soft
1981	101%	134%	33.0%	95.0%	Transitional	Soft
1982	110%	142%	32.8%	95.0%	Transitional	Soft
1983	109%	153%	44.6%	95.0%	Transitional	Soft
1984	118%	121%	2.3%	95.0%	Soft	Soft
1985	130%	96%	-33.5%	95.0%	Soft	Transitional
1986	109%	72%	-36.4%	95.0%	Transitional	Hard
1987	92%	62%	-29.8%	95.0%	Transitional	Hard
1988	84%	60%	-24.1%	95.0%	Transitional	Hard
1989	61%	62%	0.9%	95.0%	Hard	Hard
1990	69%	73%	4.2%	95.0%	Hard	Hard
1991	67%	91%	24.6%	95.0%	Hard	Transitional
1992	76%	95%	19.1%	95.0%	Hard	Transitional
1993	65%	100%	34.6%	95.0%	Hard	Transitional
1994	69%	96%	27.2%	95.0%	Hard	Transitional
1995	71%	117%	46.0%	95.0%	Hard	Soft
1996	76%	119%	43.0%	95.0%	Hard	Soft
1997	78%	134%	56.0%	95.0%	Hard	Soft
1998	88%	151%	63.7%	95.0%	Transitional	Soft
1999	106%	143%	37.4%	95.0%	Transitional	Soft
2000	106%	136%	29.7%	95.0%	Transitional	Soft
2001	136%	138%	2.8%	95.0%	Soft	Soft
2002	130%	122%	-7.4%	95.0%	Soft	Soft
2003	122%	89%	-33.0%	95.0%	Soft	Transitional
2004	96%	72%	-24.0%	95.0%	Transitional	Hard
2005	87%	70%	-17.4%	95.0%	Transitional	Hard
2006	72%	70%	-2.4%	95.0%	Hard	Hard
2007	68%	79%	11.8%	95.0%	Hard	Hard
2008	70%	89%	19.0%	95.0%	Hard	Transitional
2009	72%	96%	24.8%	95.0%	Hard	Transitional
2010	64%	104%	39.9%	95.0%	Hard	Transitional
2011					?	?



Red Years = CY indications -> write MORE business, while actual results much WORSE (average=41% worse)
 Blue Years = CY indications -> write LESS business, while actual results much BETTER (average = 29% better)
 Green Years = Actual Results TBD after Information Emerges

Actuarial Overconfidence

Figure 3 Information Gap—Calendar Year (CY) vs. Accident Year (AY)

# Years	Actual - AY			
Apparent - CY	Hard	Transitional	Soft	Total
Hard	4	7	3	14
Transitional	5	0	7	12
Soft	0	2	3	5
Total	9	9	13	31

Avg. LR Gap	Actual - AY			
Apparent - CY	Hard	Transitional	Soft	Total
Hard	3.6%	27.0%	48.4%	24.9%
Transitional	-26.4%	0.0%	37.5%	10.9%
Soft	0.0%	-33.2%	-0.8%	-13.8%
Total	-13.0%	13.6%	31.2%	

Source: *Physician Insurer*, Fourth Quarter 2011, a publication of the Physician Insurers Association of America; J. Buchanan pg. 33



Questions ?