The WC Loss Development Tail
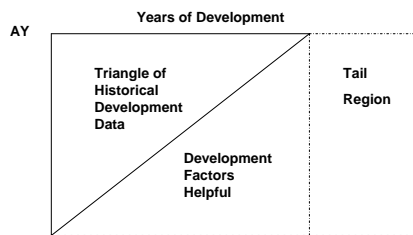
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A Typical WC Reserve Analysis: 15 DYs

Years of Development

AY

Triangle of Historical Development Data

Tail Region

Development Factors Helpful

Estimating the WC Tail @ DY 15

You have 15 year triangle & the latest large claim listing. Your options?

- Accept the case?
- Extrapolate ILDFs and PLDFs? How?
- Use external data? Different state?
- Adjust the case? Use a primitive predictive model?
- Use more complex predictive models?

Accept the Case Reserve?

- What rate of medical inflation was assumed, if any?
- Stair-stepping is quite common.
- Medical condition often evolves with aging.
- Reopened claims potential.
- Expected value of future payments is typically 25%-60% higher than the sum of projected payments until age at death.

Adjusting the Case Reserve
Using A Large Claim Listing

Data in the large claim listing (AY, DY, Age at Injury or Current Age, Paid to Date, Case Reserve, Injury Description, Gender)
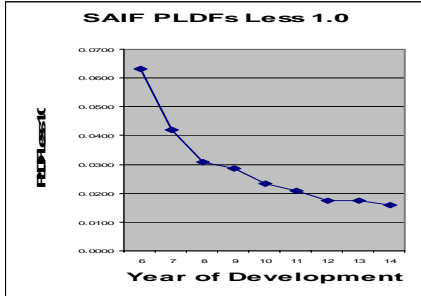
A Typical Approach:

- Split reserve into medical and indemnity.
- What rate of future medical cost escalation was assumed by the claims adjuster?
- Remove adjuster's medical cost escalation adjustment, using the claimant's life expectancy.
- Assume constant on-level incremental paids until claimant dies or claim is closed, and inflate future medical payments at your chosen rate of medical cost escalation.
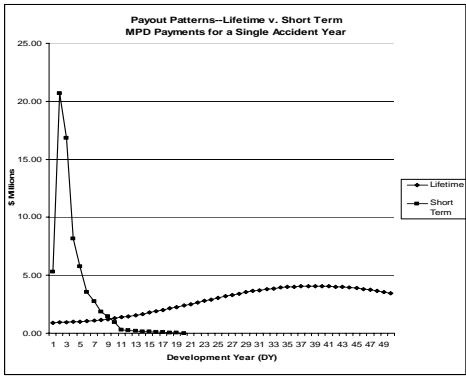
Offsetting Factors?

- Permanent disability claims may close even if the claimant keeps living.
- Claimant's condition may change, especially if they become elderly.
- In some states, at age 65 medicare picks up WC medical. Not true in Oregon & Washington.
- Can test by comparing actual PLDFs with PLDFs expected if claims close only due to death and on-level medical costs remain constant for future years—for DYs 30+.
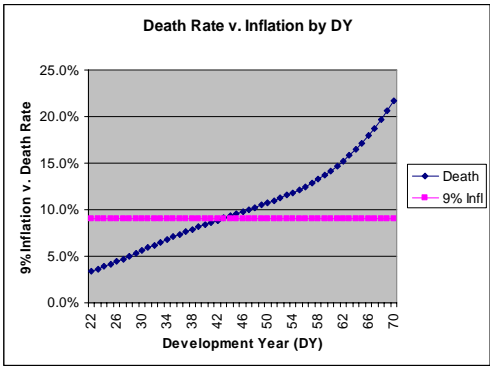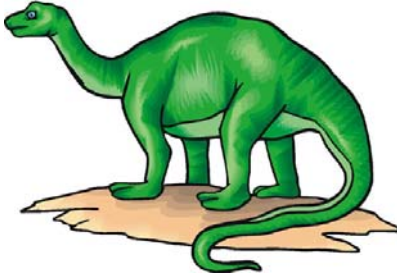
SAIF's Actual PLDFs – 1.0

SAIF PLDFs Less 1.0

PLDF Less 1C (y-axis): 0.0000, 0.0100, 0.0200, 0.0300, 0.0400, 0.0500, 0.0600, 0.0700

Year of Development (x-axis): 6, 7, 8, 9, 10, 11, 12, 13, 14

Payout Patterns--Lifetime v. Short Term
MPD Payments for a Single Accident Year

$ Millions (y-axis): 0.00, 5.00, 10.00, 15.00, 20.00, 25.00

Development Year (DY): 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49

Legend: Lifetime, Short Term

Death Rate v. Inflation by DY

9% Inflation v. Death Rate (y-axis): 0.0%, 5.0%, 10.0%, 15.0%, 20.0%, 25.0%

Development Year (DY): 22 26 30 34 38 42 46 50 54 58 62 66 70

Legend: Death, 9% Infl

We assume a brontosaurus tail.

Model v. Actual SAIF PLDFs Less 1.0

(Chart: PLDF Less 1.0 vs. Year of Development, showing Model and SAIF series)
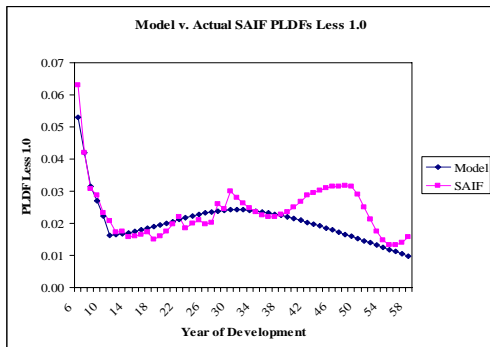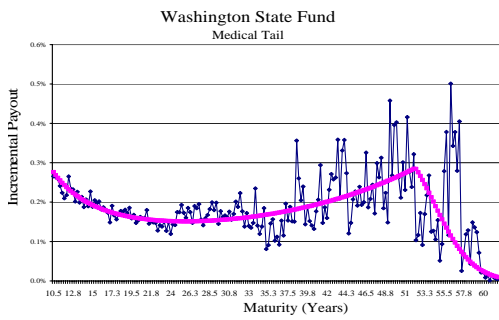

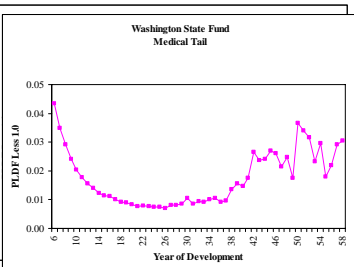## Mortality Model vs. SAIF's Actual

- 9% rate of future medical cost escalation assumed.
- Mortality rates of general population assumed.
- Model fit well out to development year (DY) 40.
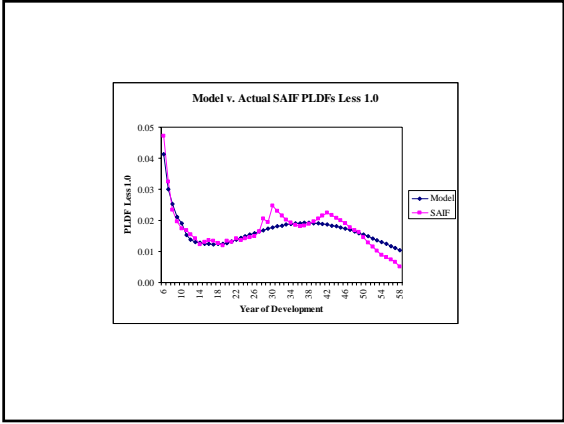- Model noticeably underestimated actual development beyond DY 40.

MPD payments: Stegosaurus tail.

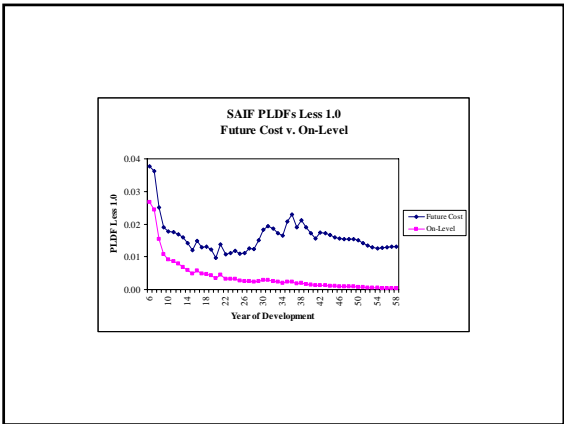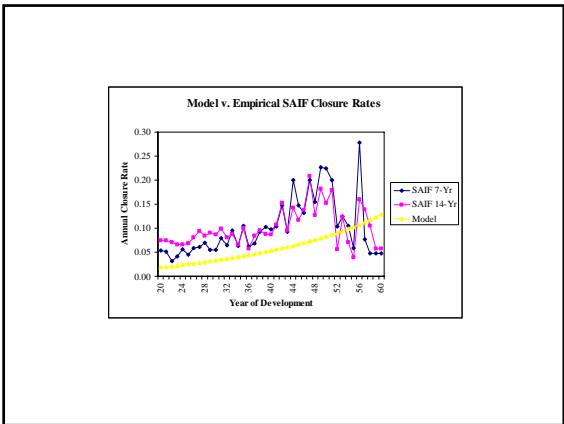# Washington State Fund PLDFs – 1.0

Washington State Fund
Medical Tail

Washington State Fund
Medical Tail

Model v. Actual SAIF PLDFs Less 1.0

SAIF PLDFs Less 1.0
Future Cost v. On-Level

Model v. Empirical SAIF Closure Rates

On-Level Incremental Paid per Claim

Development Year (DY)

Washington State Fund
On-Level Incremental Severities by DY

WALI Medical Excluding Hearing Loss
Trended Incremental Paid Per Active Claim

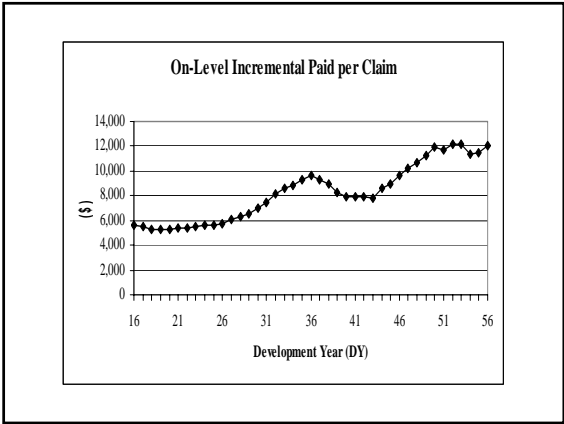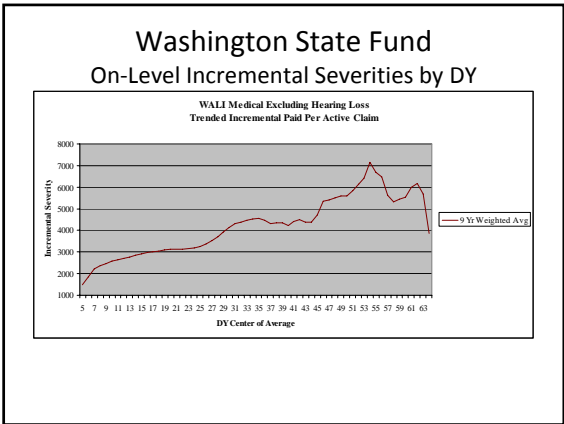9 Yr Weighted Avg

DY Center of Average

Is There an Elder Bulge?

- Permanently disabled claimant becomes elderly.
- Spouse can't continue to provide as much home care.
- WC carrier picks up cost of home care.
- Effects of existing disabilities from work tend to more seriously affect quality of life as the claimant becomes elderly.

Another reason for the rise in on-level incremental severities for late DYs.

- New research: Examined on-level incremental severities by age-at-injury, gender, claim type & DY.
- As the DY increases, the composition of surviving claimants by age-at-injury shifts dramatically to lower ages, where on-level severities are much higher.
- Younger workers are given the hazardous jobs.

Average On-Level Incremental Paid
PTD/PPD, Male/Female

Avg Age at Injury	DYs 16-25	DYs 26-40	DYs 41+	DYs 16+
15-35	5,957	8,579	16,094	7,482
36-45	5,495	6,707		5,952
46+	2,647	5,132		3,509
All	4,630	7,126	11,749	

Multiple Regression

- Dependent Variable:

  On Level Incremental Severity

- Independent Variables:

  Age-at-Injury, DY

% Young at Injury by DY

DY	20	30	40	50	60
% Young At Injury	46%	57%	71%	87%	98%

$7,000 Young & $3,500 Older

	DY 20	DY 30	DY 40	DY 50	DY 60
% Injured Young	46%	57%	71%	87%	98%
Wtd. Severity	5,100	5,495	5,985	6,545	6,930

Average On-Level Incremental Paid
PTD/PPD, Male/Female

Avg Age at Injury	DYs 16-25	DYs 26-40	DYs 41+	DYs 16+
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All	4,630	7,126	11,749	

Estimating the WC Tail,
PCAS 2005

Expected value of future payments is typically 25%-60% higher than the sum of projected payments until age at death.

See Section 8 of Paper

A Very Simple PPD Claim

- Jeremy's right leg amputated in 2004 because of work injury. He is 55.

- Artificial leg costs $1,000.

- Leg must be replaced every 15 years, at double the prior cost.

- Jeremy is expected to live until age 78, so adjuster sets up a case reserve to cover one replacement leg when Jeremy is 70.

Three Scenarios

Scenario (Age at Death)	Number of Legs	Cost of New Leg	Total Future Payments
< 70	0	$0	$0
70 - 84	1	$2,000	$2,000
85 +	2	$4,000	$6,000

Expected Value – 4.7% Med. Infl.

Age at Death	Future Payments	Probability	Fut. Pay x Probability
< 70	$0	25 %	$0
70 - 84	**$2,000**	50 %	$1,000
85 +	$6,000	25 %	$1,500
Expected Value of Future Payments			**$2,500**

Expected Value – 9.7% Med. Infl.

Age at Death	Future Payments	Probability	Fut. Pay x Probability
< 70	$0	25 %	$0
70 - 84	**$4,000**	50 %	$2,000
85 +	$20,000	25 %	$5,000
Expected Value of Future Payments			**$7,000**

Wrestling with Low Credibility and a Few Large Incremental Paids

AY	DY 46	DY 47	DY 48	DY 49	DY 50
1960			20	50	40
1961		50	225	55	
1962	45	20	60		

Wrestling with Low Credibility and a Few Large Incremental Paids

- Timing of the large payments within any given AY tends to be random among the latest 8 calendar years.
- Cap individual incremental paids at 1 standard deviation above the mean and re-distribute the excess equally among all the latest 8 diagonals, separately by AY.
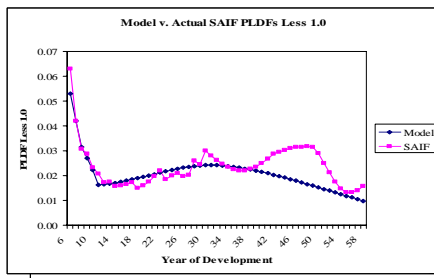

Factors Offset One Another?

Tail Fatteners:

1. Elder Bulge
2. Age-at-Injury Effects
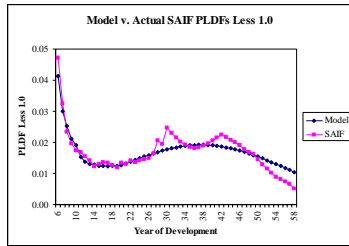3. Expected >> Pay Until Exp. Year of Death

Tail Thinners:

- Permanent Disability Claims Close for Reasons Other than Death.
- Medicare Assumes Responsibility (Some States)
- Increasing %-age of Females

CAS Paper Indications for SAIF

Latest Indications for SAIF

Model v. Actual SAIF PLDFs Less 1.0

Washington State Fund PLDFs – 1.0

Washington State Fund
Medical Tail