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Session C-7

Overcoming Claims Inadequacies: A Mortality-Based Approach to Reserving for Old Workers' Compensation Claims

Presented by: Brian A. Jones, FCAS, MAAA
Principal

brian.a.jones@us.pwc.com
(213) 217-3407

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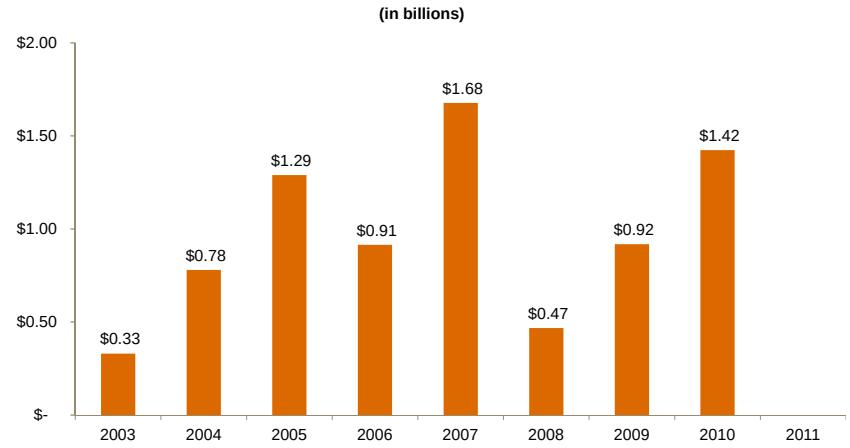
Schedule P – workers' compensation
One year development on "prior" year reserves



Industry case reserving practices contribute to reserve inadequacies

- Reserving for payments for only a fixed number of years (e.g., 5 years) rather than to ultimate
- Reserving at a "settlement" value
- Not accounting for future inflation / trend
- Not establishing a case reserve for expenses
- Failure to consider intermittent medical costs, such as prosthetic replacements or future surgeries, or high end-of-life care costs
- Using life expectancy rather than life contingency assumptions

As do some actuarial assumptions

- Lack of sufficient historical loss development or dismissal of old patterns
- Underestimates of future medical costs on life pension cases and impact of inflation

What is a mortality-based model

- Similar to pension calculations on individual lives
- An estimate of future annual claim cash flows for each claimant based on major cost components including:
  - Indemnity benefits
  - Medical payments
  - Expenses
- Reflects mortality and discount, if applicable

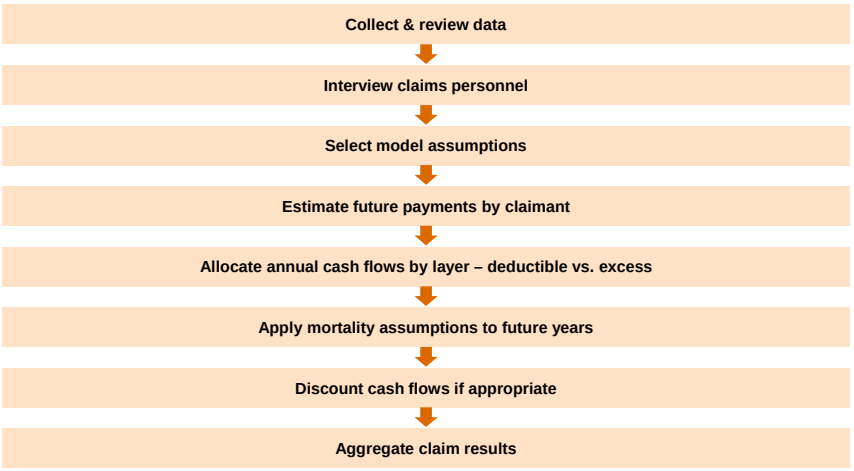
Sample mortality-based reserve calculation

Male - Age 50
Life expectancy of 30 years
Estimated annual benefit payments of $10,000
Assumed benefit inflation of 4% per year

	2011	2012	2013	...	2041	2051	2061	Total
(1)	Trended annual payments							
	10,000	10,400	10,816	...	32,434	48,010	71,067	
(2)	Probability that claimant survives through year							
	99.9%	99.7%	99.4%	...	56.0%	16.4%	0.7%	
(3)	Expected future payments (1)x(2)							
	9,989	10,365	10,752	...	18,176	7,886	527	650,028

(A life expectancy approach assuming trended annual payments over the next 30 years would produce a cost of $561,000)

What are the steps in building a mortality-based model



Typical data elements

Claimant	Injury	Benefits	Insurance Information
Claim Number / Name	Injury date	Annual indemnity benefit	Historical Deductibles / SIR
Date of Birth	Type of injury	Annual medical benefit history	Excess insurance limits
Gender	Life impairment, if any	Annual expense payment history	Expense treatment, e.g. pro-rata, within limit, etc.
		Current case reserves by component	

Major model assumptions

The four primary assumptions needed for a mortality-based estimation are:

Annual Future Costs • Indemnity • Medical • Expense	Inflation / Trend	Life Contingencies / Mortality *	Discounting*

*** If deductibles or excess layers are applicable, distribute losses by layer before applying mortality and discounting.**

Future annual costs

Indemnity

- Benefits are statutorily-defined on a state basis
- Permanent total disability awards are usually unlimited, but permanent partial awards have time limits in certain states; there may also be offsets for Social Security and/or pension plans upon retirement.
- May be level or indexed by cost of living adjustments

Medical

- Medical payments are unlimited under workers' compensation coverage
- Substantial medical costs can occur early in the claim due to hospitalization/surgeries, but then level off after several years as maximum medical improvement is reached
- Future cost spikes are still possible, e.g., intermittent surgeries, equipment replacement, custodial end-of-life care
- Annual costs can be based on review of historical annual payments and/or claims adjusters projections (uninflated)
- Can further segment medical costs into major components (e.g., hospital, physicians, pharmaceuticals, attendant/nursing care, etc.) to address mix/trend differences

Expenses

- Annual costs can be based on historical annual payments and/or claim adjuster projections
- A "short-cut" approach might be to use a percentage loading on projected losses

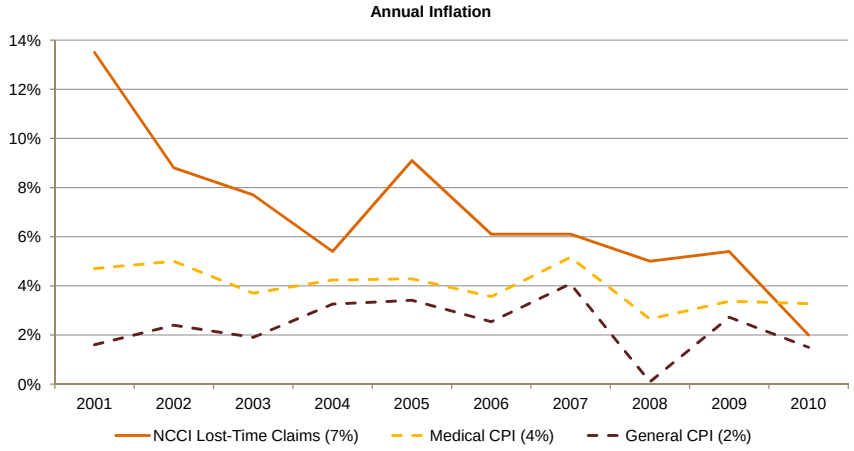
Inflation / Trends

Sample claim with various medical inflation assumptions

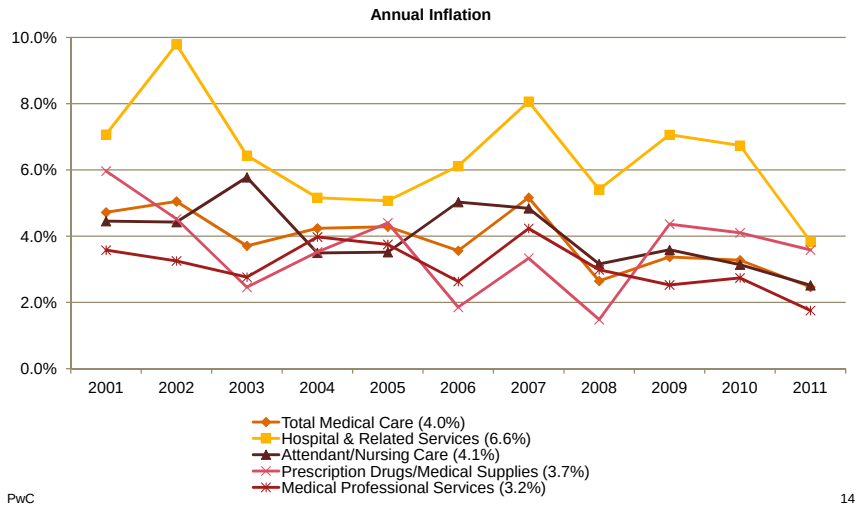
For our 50 year old male with initial annual payments of $10,000, mortality-based estimates of total projected medical payments are:

Annual Medical Inflation	Total Projected Payments
4%	$650,000
6%	$1,005,000
8%	$1,615,000

Medical inflation (CPI) has historically been higher than general inflation, and WC medical trends have been even higher



Inflation assumptions can vary for the different components of future medical payments



Selecting mortality assumptions

When selecting mortality assumptions consider

Applicability of the base population to the claimant population	Adjustments for improvements in mortality over time	Impact of disability on mortality

Mortality tables are created for different purposes

Life Insurers	• Proprietary tables • Expected to have better mortality than the general population • May contain conservative margin
CDC	• Vital Statistics Tables • Based on census and Medicare data • Mortality may be higher than pensioner experience
Pension Plans	• RP2000 most recent comprehensive SOA study • Population based on current and retired workers • Better mortality experience than the general population

RP 2000 tables

- The RP 2000 mortality table is the most recent comprehensive mortality study performed by the SOA with sub-populations for:
  - Male vs. Female
  - Healthy vs. Disabled
  - Blue Collar vs. White Collar
- Commonly used in private pension plan valuation.
- Based on data
  - From around 100 uninsured pension plans
  - 11 million life years of experience between 1990 and 1994
  - With improvements projected to 2000
- Pensioner life expectancy may be favorable compared to the general population.
- Can be scaled forward for improvements in life expectancy.

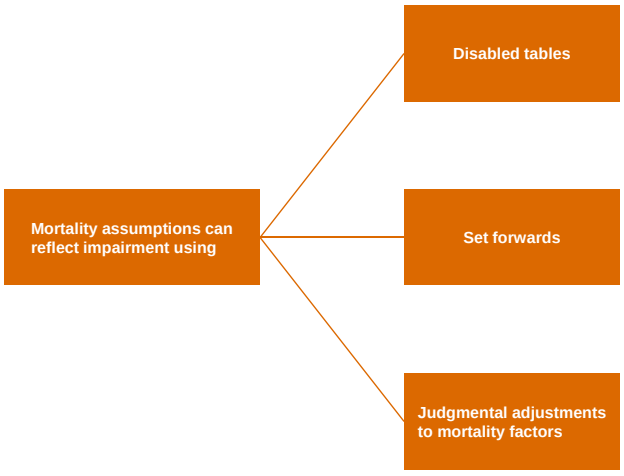
Mortality improves over time

- During the last century, general population mortality has improved significantly due to medical advancements, improved work conditions, public health initiatives, etc.
- Most experts expect continued improvements in life expectancy.
- A claimant aged 40 today will have a lower probability of death in his 60th year than a claimant aged 60 today.
- Adjustments for improvements in mortality over time can be incorporated through
  - Scale adjustments.
  - Generational tables constructed from a series of static tables which have been adjusted for improving mortality.

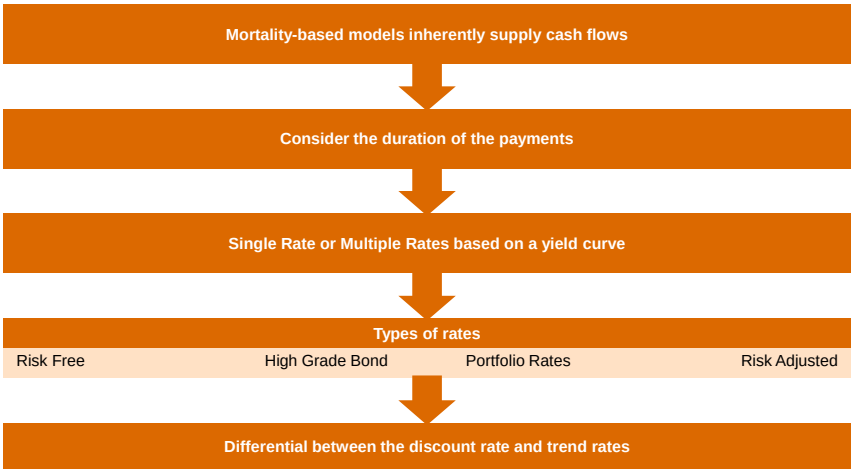
Different tables and the impact of mortality improvement

Age	GAM-83	GAM-94	RP-2000	RP-2000 Scaled to 2011	RP-2000 Generational	RP-2000 Scaled to 2031
Male Life Expectancy						
30	46.5	49.2	49.5	50.6	54.4	52.6
40	36.9	39.6	39.8	40.9	43.9	42.9
50	27.7	30.2	30.3	31.4	33.4	33.3
60	19.3	21.3	21.2	22.2	23.4	23.9
70	11.9	13.8	13.4	14.1	14.7	15.4
Female Life Expectancy						
30	52.8	53.8	52.5	53.1	55.4	54.3
40	43.1	44.0	42.7	43.3	45.1	44.4
50	33.5	34.4	33.1	33.7	34.9	34.7
60	24.3	25.1	23.9	24.4	25.2	25.3
70	15.9	16.8	15.7	16.2	16.6	17.0

Some workers' compensation claimants are expected to have impaired life expectancy



Discounting



Strengths and weaknesses of a mortality-based approach

Strengths

- Intuitively appealing
- Does not require development history
- Easily lends itself to sensitivity testing
- Good for small populations of claims where traditional methods may be too "crude"
- Inherently produces cash flows useful for layering and discounting

Weaknesses

- Claims need to reach a "maintenance" mode
- Requires detailed data on open claims
- Requires technical skills / specialized software
- Requires several judgments
- No estimate for re-openings

Applications of a mortality-based approach

- Occupational disease claims
- Tail factor estimation
- Reserving for run-off portfolios
- Commutations & LPTs
- Reinsurance reporting
- Claim settlements
- Guaranty funds
- Second injury funds