

2001 CSO Table

Valuation Actuary Symposium

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Session 10PD

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Northwestern Mutual

2001 CSO Background

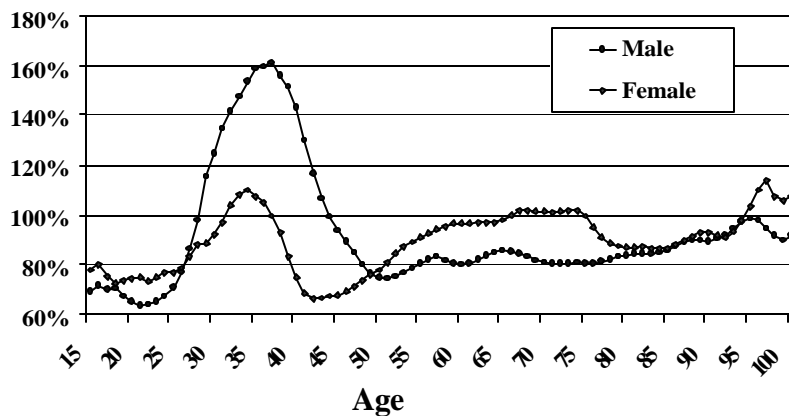
- *NAIC Life and Health Actuarial Task Force*
- *SOA Individual Experience Studies Committee*
- *SOA Individual Life Insurance Valuation Mortality Task Force*
- *AAA CSO Task Force*
- *AAA CSO Implications Work Group*

1990-95 Basic Mortality Tables

- 1990-95 experience
- 21 companies, \$5.7 trillion of exposure
- Standard, fully underwritten ordinary individual life insurance policies
- Select and ultimate form
- Issue ages 0-99, attained ages to 120
- Smoker distinct

1990-95 Basic Table as a % of 1975-80 Basic Table

Ultimate, Composite



2001 Valuation Basic Table

- *Developed for use in creation of valuation mortality*
- *Based on SOA 1990-95 experience, with adjustments for:*
 - *older age mortality*
 - *smoothness / select period*
 - *mortality improvement*

Older Age Mortality Adjustments

- *Issue ages above 75 and attained ages above 90*
- *SOA used other data sources:*
 - *Veterans Administration*
 - *Bragg*
- $q_{120} = 1$

Smoothness / Select Period Adjustments

- *1990-95 experience table focused on fit to data rather than smoothness*
- *VBT was smoothed:*
 - *at ages 25 - 45 for males*
 - *in durations 10 - 25*
- *VBT has 25 year select period*

Mortality Improvement Adjustments

- *SOA 1990-95 experience has a central year of 1992*
- *SOA Task Force believed:*
 - *new CSO table would be effective no earlier than 2001*
 - *not appropriate to project beyond effective date of valuation table*
- *9 year mortality projection in 2001 VBT*

Mortality Improvement Adjustments (cont.)

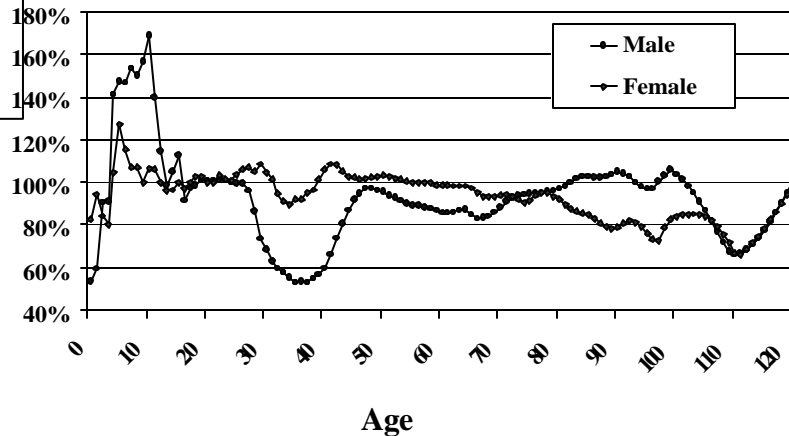
- *Reviewed both insured and secular mortality improvements*
- *Focused on general improvement (not driven by changes in underwriting)*
- *Annual improvement used in 2001 VBT:*
 - *None for ages 0 - 45 and 90+*
 - *Male - 1.0% for ages 55 - 80*
 - *Female - 0.5% for ages 55 - 85*

Form of 2001 VBT (and 2001 CSO Table)

- *6 tables (M / F, S / NS / Composite)*
- *Issue ages 0 - 99, attained ages to 120*
- *No preferred risk class tables*
 - *lack of identifiable experience*
 - *lack of clear definition of preferred risk class*

2001 VBT as a % of 1990-95 Basic Table

Ultimate, Composite



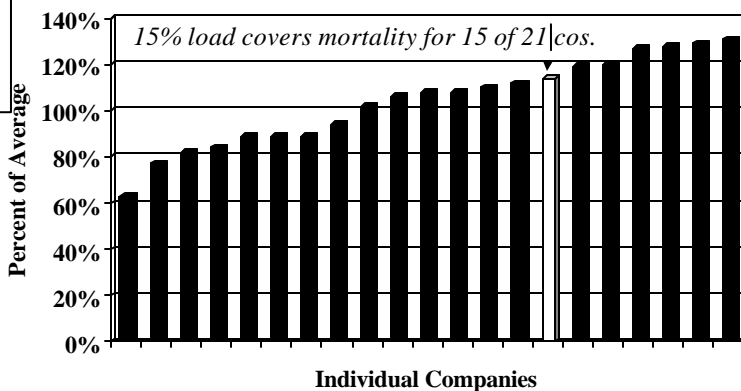
Development of 2001 CSO Table

- *Load required to account for:*
 - *Data confidence (not an issue for 2001 VBT)*
 - *Company variation*
 - *Random fluctuation*
 - *Unknown variation*
- *There is no one, unique appropriate load*

Development of 2001 CSO Table (cont.)

- *AAA CSO Task Force sought input from LHATF regarding:*
 - *approach used to determine load*
 - *level of the load*
 - *form of the load*
- *LHATF's input:*
 - *use mortality margin approach*
 - *an overall load level of 15%*
 - *$1/e_{[x]+t}$ form of the load*

SOA 1990-95 Comparative Mortality Study



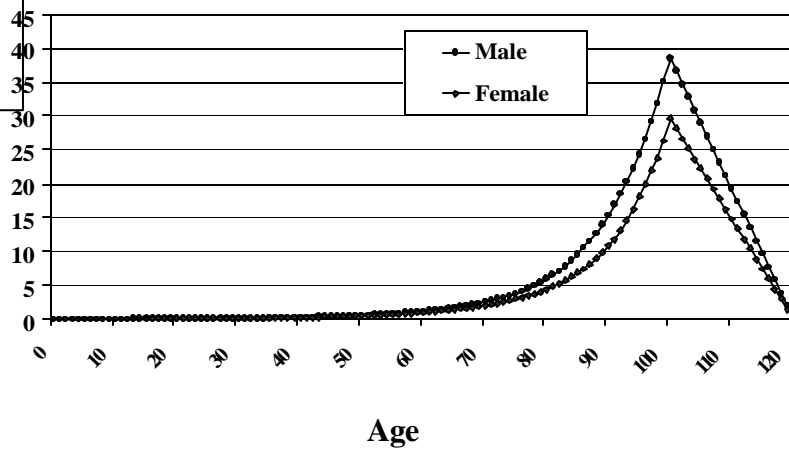
Development of 2001 CSO Table (cont.)

- 2001 CSO loading formula:

$$\text{Load}_{[x]+t} = [0.0056 - 0.00016(x+t) + 0.000008(x+t)^2] / e_{[x]+t}$$

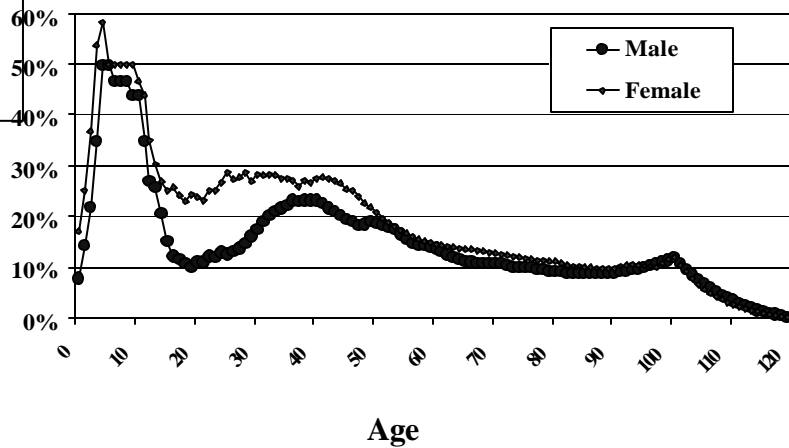
2001 CSO Table Loading Extra Deaths per 1000

Ultimate, Composite



2001 CSO Table Loading as a % of 2001 VBT

Ultimate, Composite

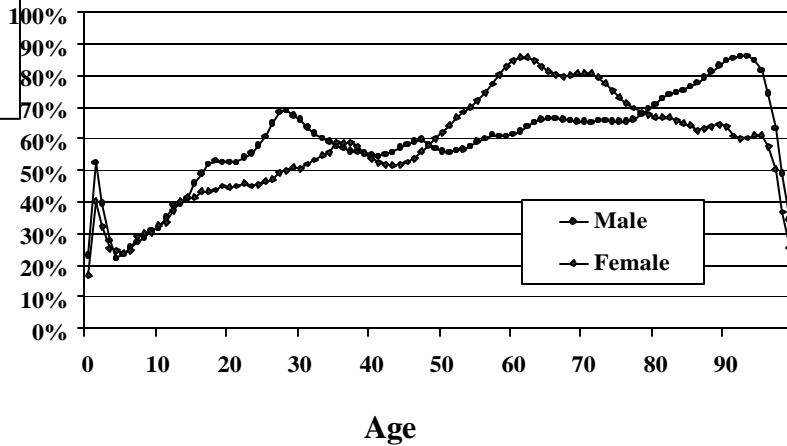


Development of 2001 CSO Table (cont.)

- 2001 CSO load, when expressed as a percent, is larger for:
 - females than for males
 - nonsmokers than for smokers
 - younger ages than for older ages
- 2001 CSO load, when expressed in terms of number of deaths, is larger for:
 - males than for females
 - smokers than for nonsmokers
 - older ages than for younger ages

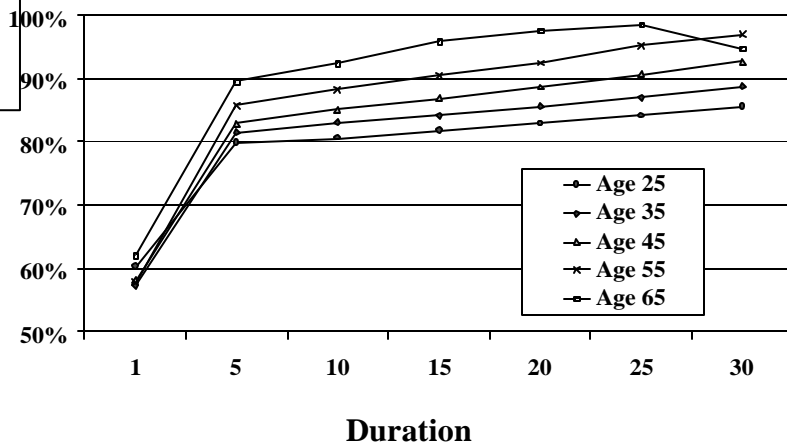
2001 CSO Table as a % of 1980 CSO Table

Ultimate, Composite



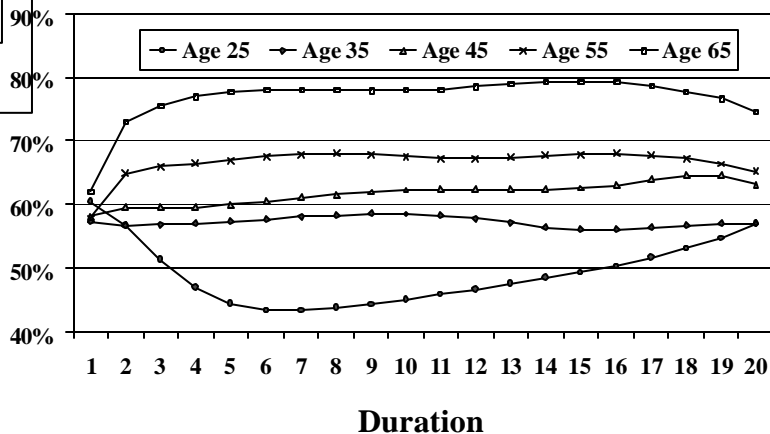
Whole Life Mean Reserves 2001 CSO as a % of 1980 CSO

Ultimate, Composite, Male



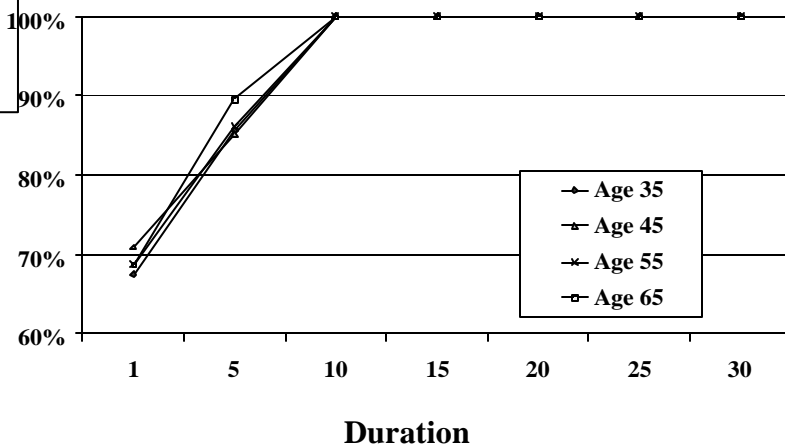
20 Yr Level Prem Term Mean Reserves 2001 CSO as a % of 1980 CSO

Ultimate, Composite, Male



UL Level Prem to Zero Mean Reserves 2001 CSO as a % of 1980 CSO

Ultimate, Composite, Male



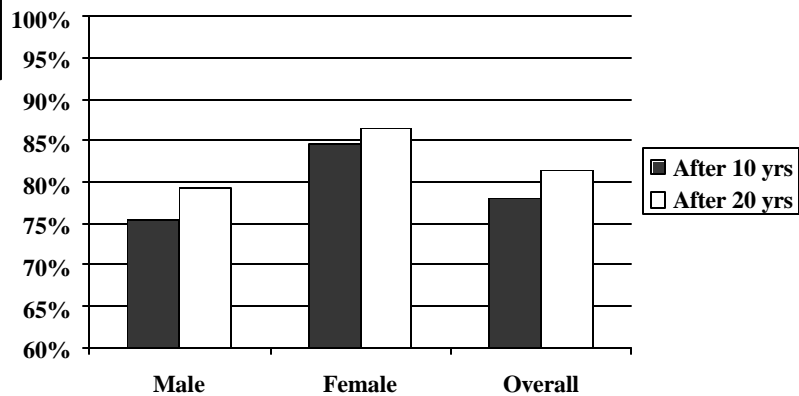
Development of 2001 CSO Table (cont.)

■ *Model office*

- *Whole life, UL & 20 year level premium term*
- *Issue ages 25, 35, 45, 55 & 65*
- *Male & female*
- *Sales increase 5% per year*
- *Level 4% lapse assumption*
- *Ultimate mortality*

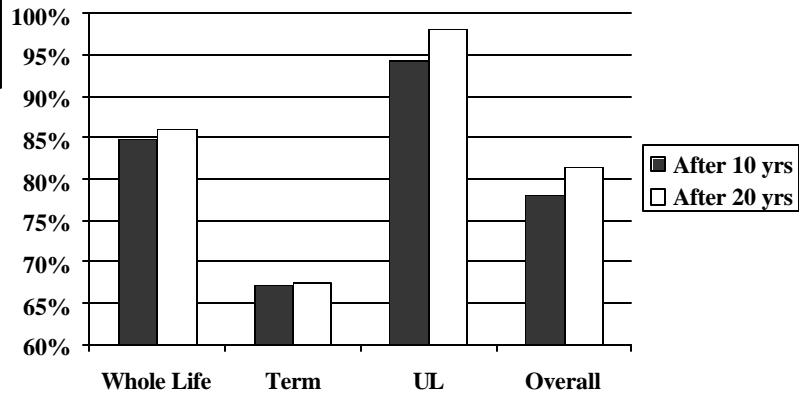
Ratio of 2001 CSO Table Reserves to 1980 CSO Table Reserves

*Aggregated Results by Gender
Ultimate, Composite*



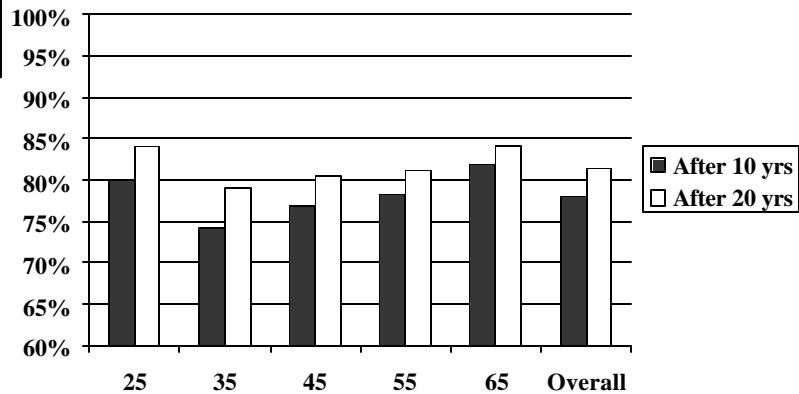
Ratio of 2001 CSO Table Reserves to 1980 CSO Table Reserves

Aggregated Results by Plan Ultimate, Composite



Ratio of 2001 CSO Table Reserves to 1980 CSO Table Reserves

Aggregated Results by Issue Age Ultimate, Composite



Development of 2001 CSO Table (cont.)

■ *Observations*

- *Overall, reserves based on the proposed 2001 CSO Table are about 20% lower than reserves based on the 1980 CSO Table, with larger reductions for term*
- *New reserve levels should promote increased policyholder value without sacrificing reasonable solvency protection*

Development of 2001 CSO Table (cont.)

■ *Bragg data*

- *1990-94 data from 23 companies, 9 of which overlap with the 1990-95 SOA data*
- *Overall mortality level consistent with SOA data*
- *Different shape of mortality than SOA data*
- *Generally a little flatter slope than SOA data*
- *Reflecting Bragg data in the 2001 CSO would cause reserves to go down in the aggregate*