

# Update on Development of New Mortality Tables

Society of Actuaries & American Academy of Actuaries Joint  
Project Oversight Group

Mary Bahna-Nolan, FSA, CERA, MAAA  
Chair, Academy Life Experience Subcommittee

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# Payout Annuity Mortality Table

# Progress To-Date

- Analyzed 2000-2004 payout annuity mortality experience
- Created a preliminary table, with confidence intervals at each age, through application of P-Splines for ages 50-94
- Graduated  $q_x$ s from the data for males and females with confidence intervals
  - Method used provided a 95% confidence interval of graduation
  - Result with  $q_x$ s generally ranging between 99-101% of the best estimate for key ages, 65-95
  - Does not have a good fit at younger and older ages



# Progress To-Date cont'd

- Analyzed mortality at younger and older ages
  - Mortality rates at these ages have little impact on the final reserve
  - Compared results to several existing industry tables, including: 1994 GAM projected with Scale AA to 2002, 2008 VBT RR100, Annuity 2000, 2006 U.S. Life Tables
    - 1994 GAM and A2000 table reasonably close at ages 20 and 35, significant divergence at 50
    - 1994 GAM lower than population, Annuity 2000 rates significantly lower than population and more recent life experience table at highest ages for male risks

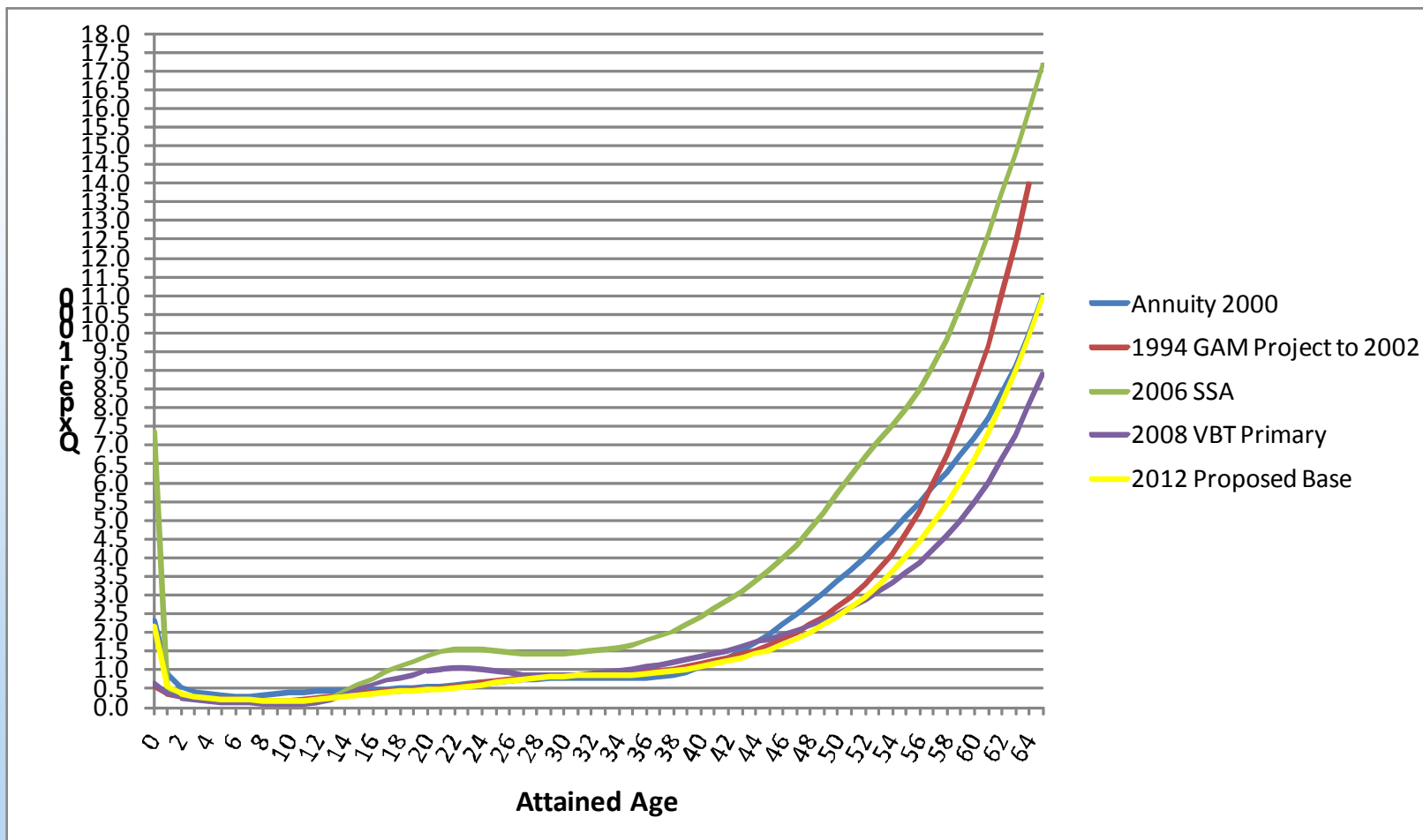


# Progress To-Date cont'd

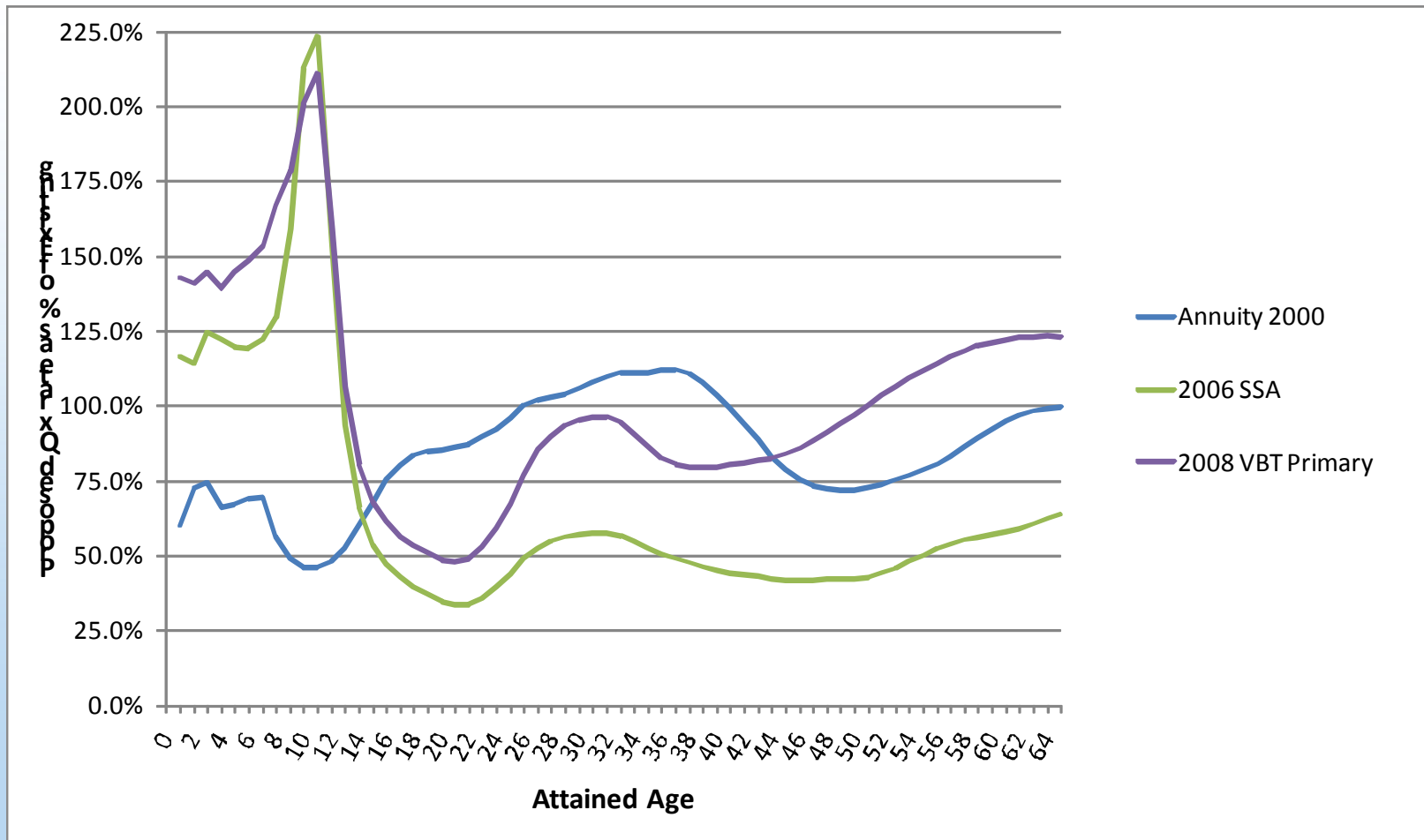
- Younger ages
  - For ages 1-50, used 1994 GAM projected with Scale AA to 2002
  - For age 0, use 4 times age 1 rate
- Ages 51 through 64, grade to experience table

# Proposed mortality rates per 1,000

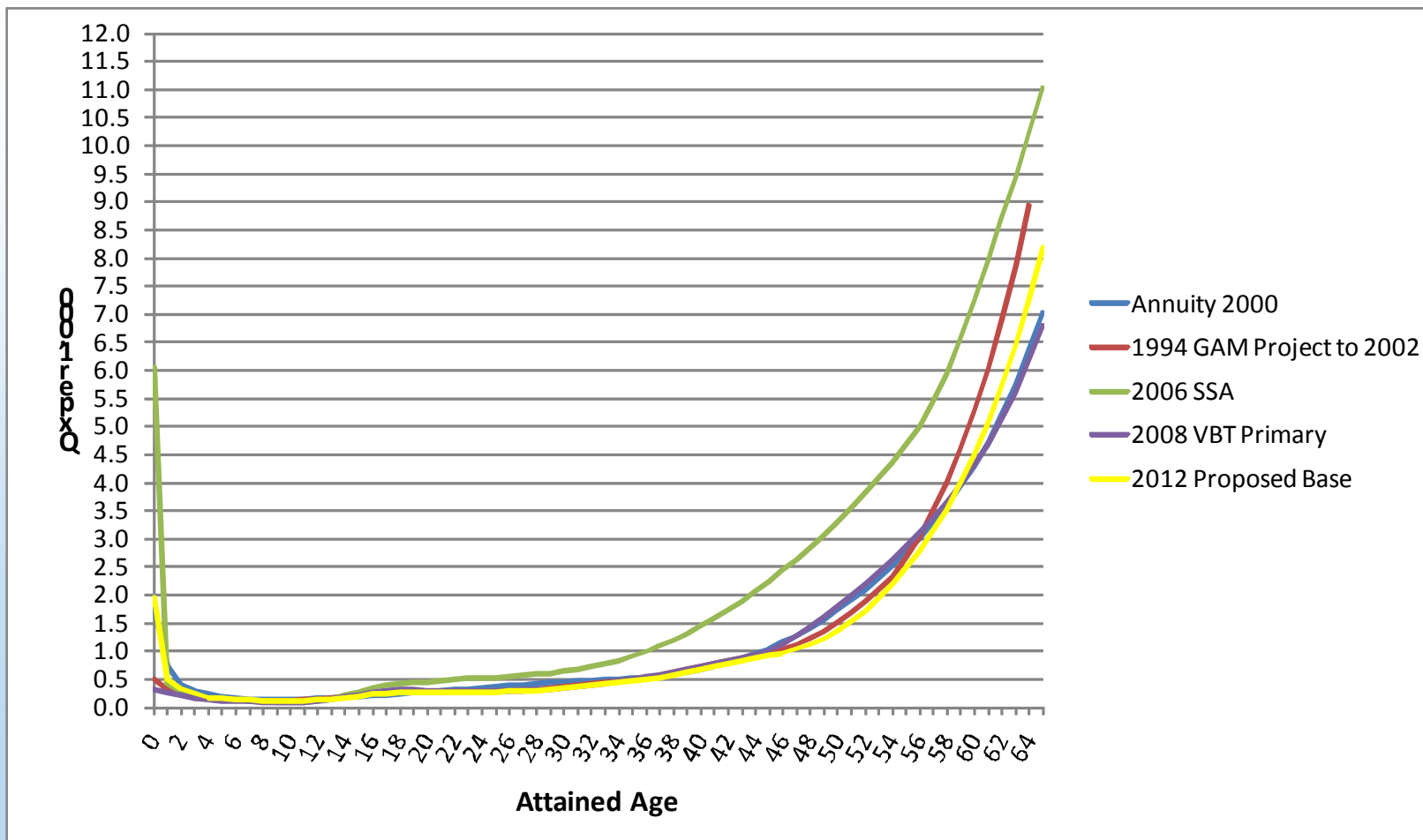
## Male risks, ages 0-65



# Relationship of proposed mortality to existing Male risks, ages 0-65

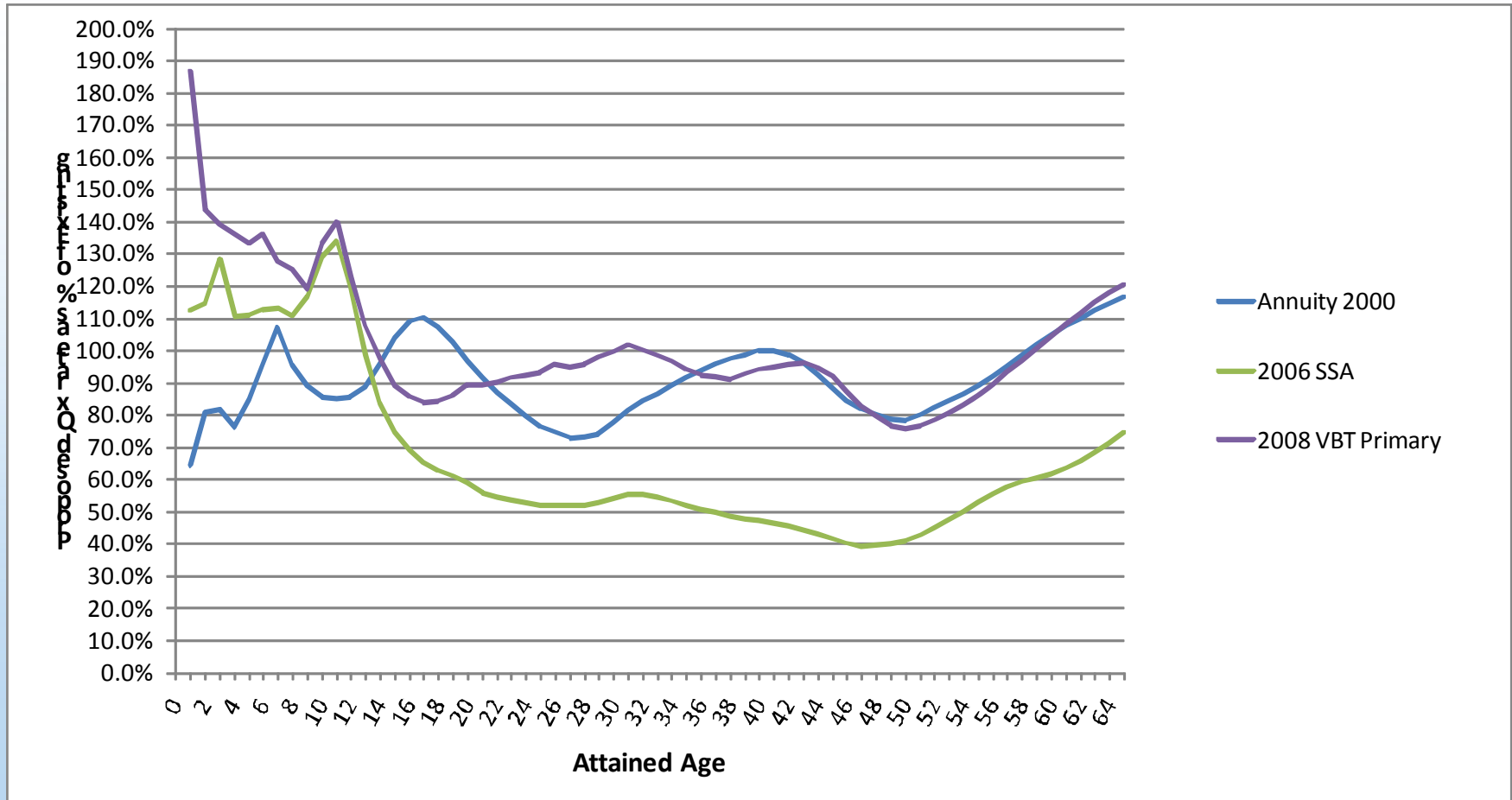


# Proposed mortality rates per 1,000 Female risks, ages 0-65





# Relationship of proposed mortality to existing Female risks, ages 0-65



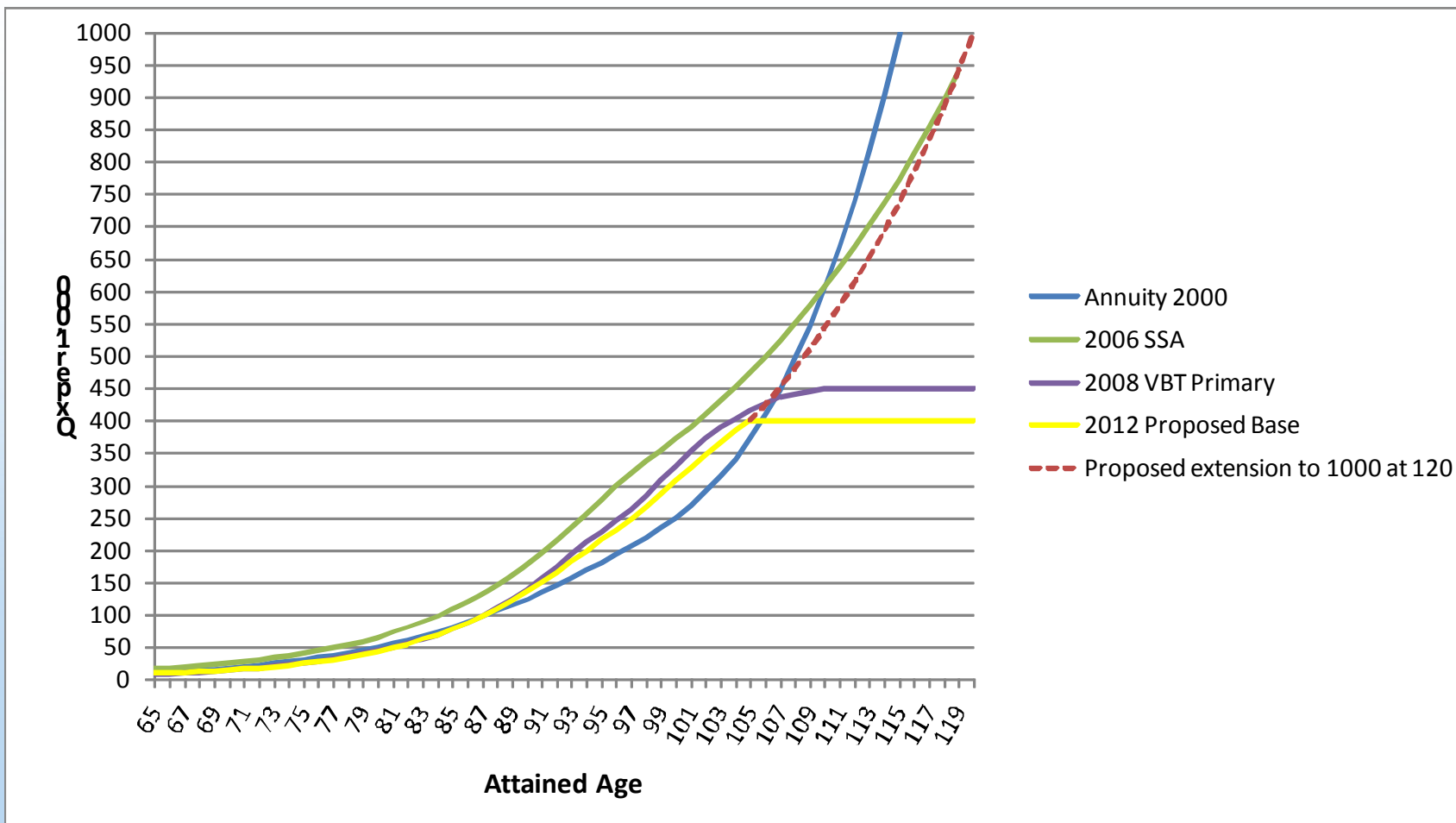
# Progress To-Date cont'd

- Older ages
  - For ages 96+, use Kinnisto extension
  - Cap mortality at 0.400 per 1,000
    - Cap comes in at 105 for males, 107 for females
  - No cap for life or population mortality
  - Still results in mortality rates in excess of annuity 2000
    - For males: ages 87+
    - for females, ages 59-72, 96+
  - For valuation table, grade to 1.000 at 120

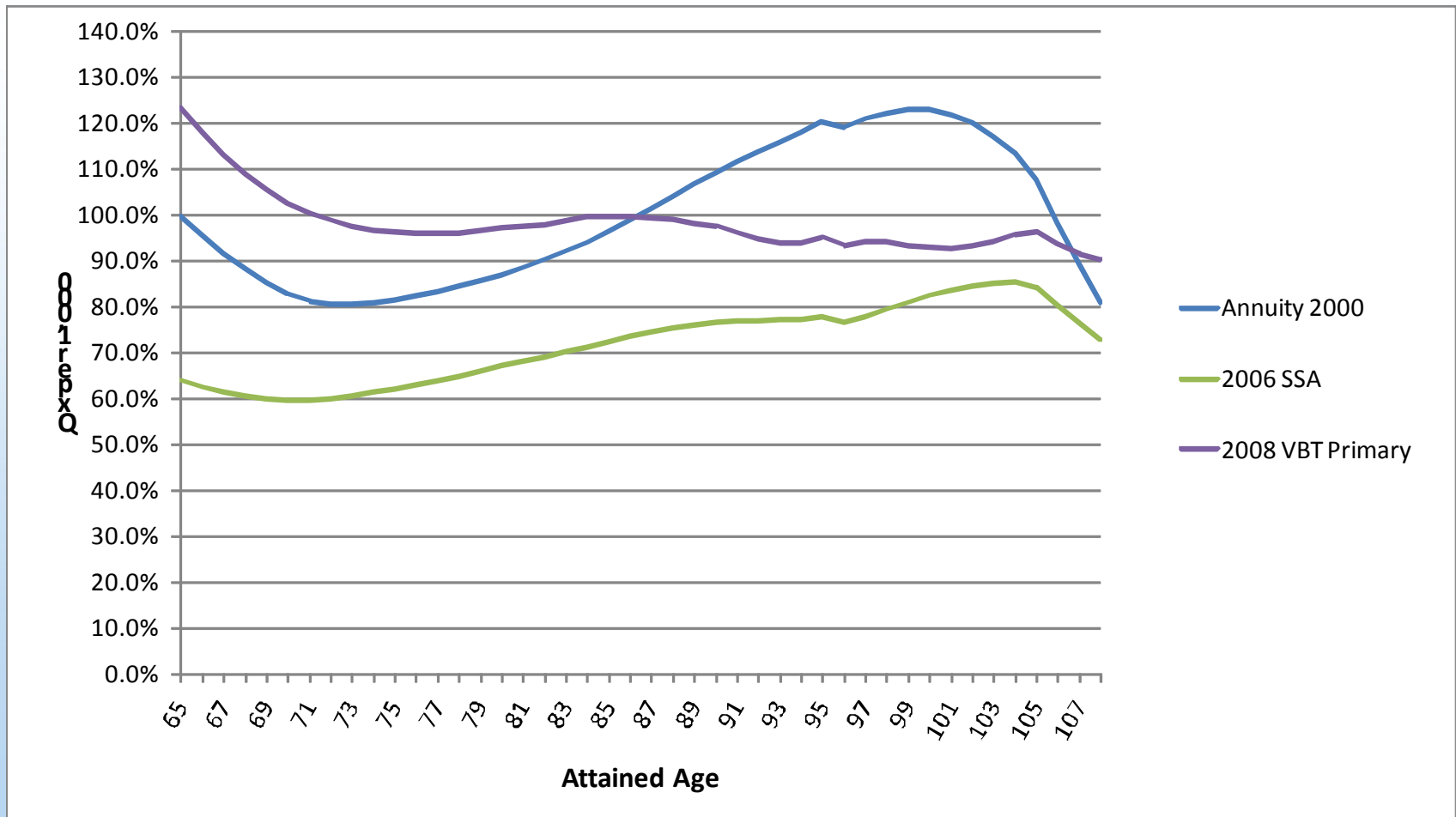


# Proposed mortality rates per 1,000

## Male risks, ages 65-120

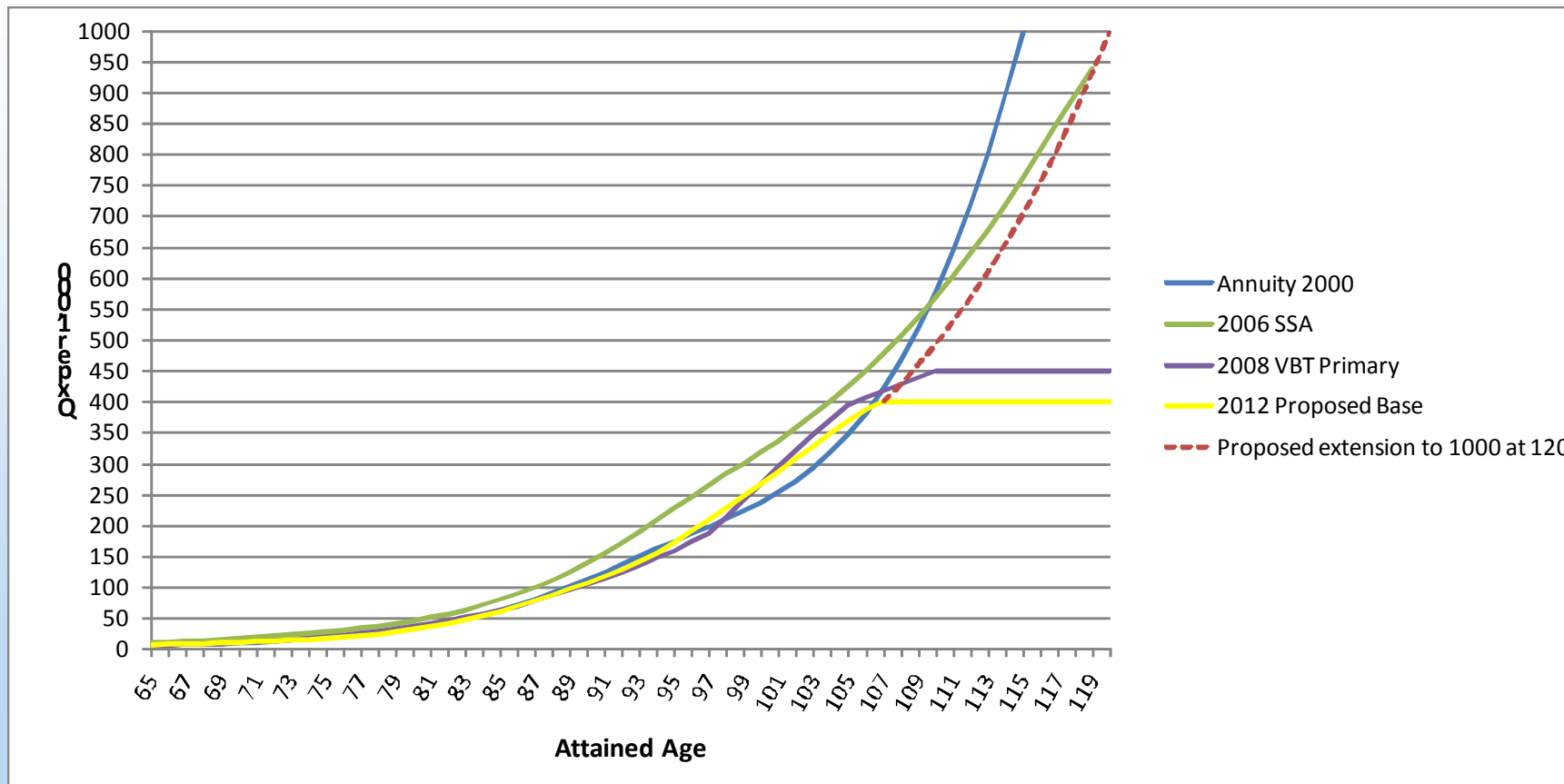


# Relationship of proposed mortality to existing Male risks, ages 65-108

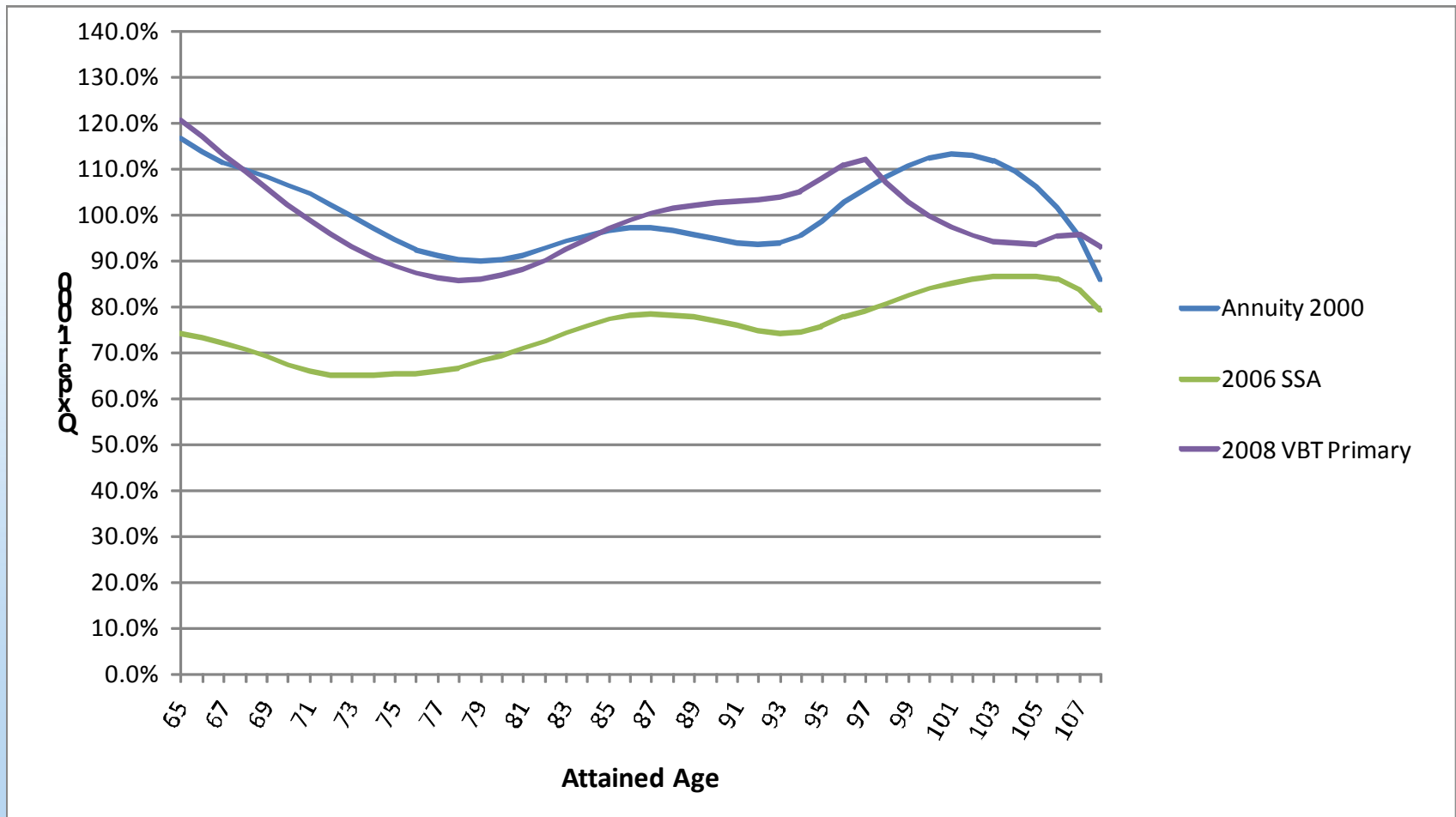


# Proposed mortality rates per 1,000

## Female risks, ages 65-120



# Relationship of proposed mortality to existing Male risks, ages 65-108



# Improvement and Future Projection

- Analyzed various sources of mortality improvement
  - Historical versus future projection
  - Social Security Administration 2010 Trustee's Report (preliminary)
  - Canadian Institute of Actuaries September 2010 Report
  - Human Mortality Data Base
  - CDC
  - Towers Watson research on mortality improvement
    - Expected first look by end of October
- Improvement and disimprovement from year to year
  - 2004 and 2006 showed high improvement for most ages whereas 2003 showed disimprovement
- SSA actual reported through 2006



# Improvement and Future Projection

## Comparison of Various Improvement Rates - Males

Social Security Improvement Rates - 2010 Trustees Report								
Male	Actual	Actual	Actual	Forecast	Avg SSA	Scale		CIA
Age	1990-2000	2000-2006	1990-2006	2010-2030	2002-2006	AA	Scale G	Proposal
25	2.9%	-2.0%	1.0%	0.9%	-2.0%			
30	4.2%	-1.3%	2.1%	1.1%	-1.1%			
35	3.8%	0.8%	2.7%	1.1%	1.4%			
40	1.8%	1.3%	1.6%	1.0%	2.0%			
45	0.6%	1.1%	0.8%	0.9%	1.6%			
50	1.3%	-0.6%	0.6%	1.0%	-0.1%	1.8%	1.8%	1.5%
55	1.9%	0.5%	1.4%	1.2%	0.5%	1.6%	1.6%	1.2%
60	2.2%	1.5%	1.9%	1.5%	1.7%	1.6%	1.5%	1.0%
65	1.9%	2.4%	2.1%	1.2%	2.6%	1.4%	1.5%	1.0%
70	1.5%	3.0%	2.0%	1.1%	3.2%	1.5%	1.4%	1.0%
75	1.4%	2.6%	1.9%	1.0%	2.9%	1.0%	1.2%	1.0%
80	1.1%	2.3%	1.5%	1.1%	2.5%	1.0%	1.2%	1.0%
85	0.2%	2.2%	1.0%	0.7%	2.6%	0.7%	1.2%	1.0%
90	-0.4%	1.4%	0.3%	0.5%	2.0%	0.4%	1.1%	1.0%
95	-0.8%	0.4%	-0.3%	0.4%	1.1%	0.3%	1.1%	0.5%



# Improvement and Future Projection

## Comparison of Various Improvement Rates - Females

Social Security Improvement Rates - 2010 Trustees Report								
Female	Actual	Actual	Actual	Forecast	Avg SSA	Scale	50%	CIA
Age	1990-2000	2000-2006	1990-2006	2010-2030	2002-2006	AA	Scale G	Proposal
25	1.6%	-1.5%	0.5%	0.8%	-1.8%			
30	1.8%	-0.4%	1.0%	0.9%	-0.5%			
35	0.6%	0.7%	0.7%	0.8%	1.4%			
40	-0.6%	0.4%	-0.2%	0.7%	1.4%			
45	0.1%	-0.6%	-0.1%	0.8%	0.4%			
50	1.2%	-0.6%	0.5%	1.0%	-0.4%	1.7%	1.0%	1.5%
55	1.2%	1.2%	1.2%	1.2%	1.3%	0.8%	0.9%	1.2%
60	1.1%	1.7%	1.3%	1.3%	1.7%	0.5%	0.9%	1.0%
65	0.5%	2.4%	1.2%	1.0%	2.5%	0.5%	0.9%	1.0%
70	0.3%	1.9%	0.9%	0.8%	2.2%	0.5%	0.9%	1.0%
75	0.2%	1.6%	0.7%	0.8%	2.0%	0.8%	0.8%	1.0%
80	-0.1%	1.6%	0.6%	0.9%	2.1%	0.7%	0.8%	1.0%
85	-0.4%	1.4%	0.3%	0.5%	1.9%	0.6%	0.8%	1.0%
90	-0.7%	1.0%	-0.1%	0.4%	1.5%	0.3%	0.7%	1.0%
95	-0.9%	0.7%	-0.3%	0.4%	1.1%	0.2%	0.6%	0.5%

# Improvement and Future Projection

- Project using actual by age from 2002-2006
  - Open considerations:
    - level of smoothing between ages
    - floor at 0%
- Still determining:
  - Appropriate improvement for 2007 to 2012
  - Variation between males and females
  - Projection scale for 2012 and beyond
  - Age at which to wear off improvement (e.g., 105)



# Next Steps

- Finalize review and recommendation for improvement and projection scales
- Recommend margin
  - Likely split by pension amount
- Final proposed table with margin beginning of December
  - LHATF conference call?
- Review preliminary results from more recent (2005-2008) data call
  - More contributors, especially large annuity writers
  - Expected early 2011

# Guaranteed Issue/Simplified Issue Mortality Update

# Status for Industry Studies

- Two data calls
  - Pre-need
  - All Other distribution
- MIB appointed as statistical agent
- Working with MIB to develop data call
  - Challenge to simplify yet ensure comprehensive
  - Working with VM-51 format

# Status for Industry Studies

- Timing (optimistic)
  - December: Data call
  - End of March: Data submissions due
  - End of June: Data cleansing/validation
  - Early 2012: First draft of tables(2)

# 2012(?) VBT/CSO

# Current Status

- Recently received comprehensive data analysis for 2002-2007 experience
- Working with MIB/SOA to obtain more granular level to data, especially at:
  - Attained ages
  - Older ages
  - Ultimate durations
- Members of ACLI on team to address any industry considerations relative to CSO table structure
- Proposed timetable and status at next LHATF meeting