



Institute of Actuaries of Australia

# 4th Financial Services Forum

*Innovation in Financial Markets*

19 and 20 May 2008 – Melbourne

## **Mortality of Public Sector Scheme Pensioners 2005-2007 update**



## Overview

- **Pensioner Database**
- **Australian Public Sector pensioner mortality – 2005-7 update**
- **Extensions to the update:**
  - Invalidation pensioner experience
  - Mortality improvement experience



## The Pensioner Database

- **Database now operational**
  - Following the 2002-05 study, a database has been set up with the aim of collecting information on pensioners from occupational superannuation funds.
  - A subset of this data has been used for this paper.



## The Pensioner Database

- **Data now available is large**
  - Currently 17 participating schemes
  - ~ 1.5 million pensioners in the database
  - Data covers 5 years to 2007 for most schemes, giving a total over 2.8 million exposure years
  - Data growth at higher ages expected



## The Pensioner Database

- **Data quality is high**
  - Comprehensive checks placed on data
  - Pensioner data is to some extent inherently reliable
  - Reconciliation of data from year to year permits updating older data – in particular to redress late reporting of deaths
  - Consistency between funds



# The Pensioner Database

- **Ongoing study**
  - The experience reported in this paper is the beginning of a long term project to collect data, study pensioner mortality and mortality improvements and to publish the results



# **Australian Public Sector Mortality 2005-2007 update**

- Results of a 2002- 2005 Public Sector pensioner mortality study were reported at the 2006 Financial Services Forum
- The 2005-2007 experience confirms these results



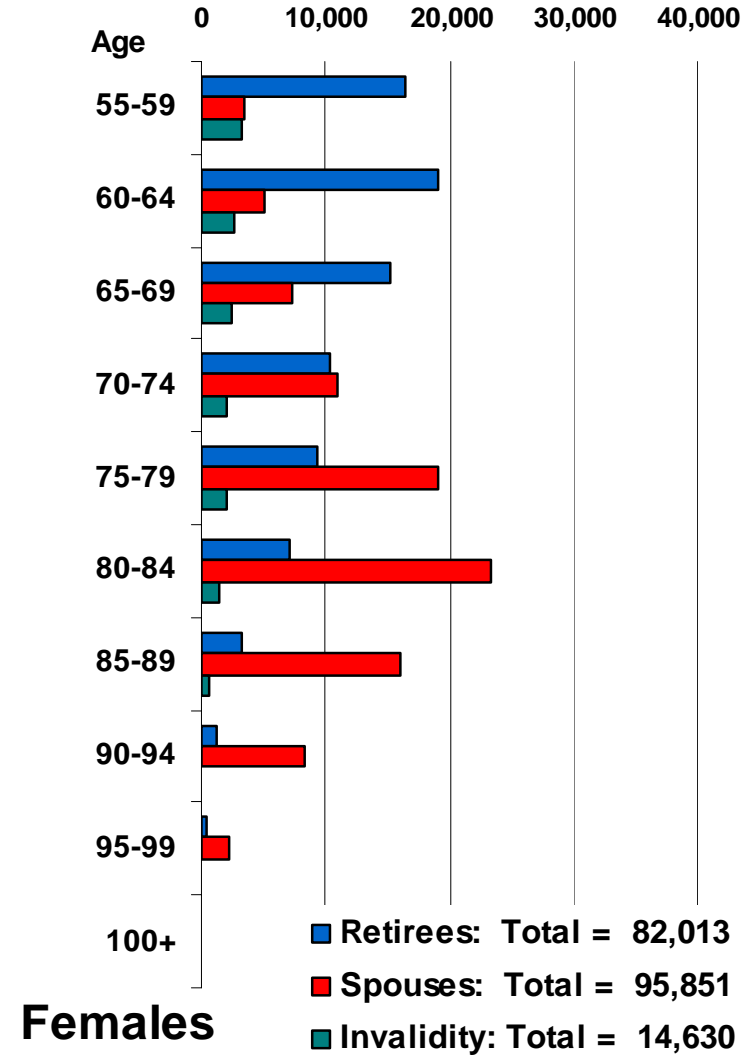
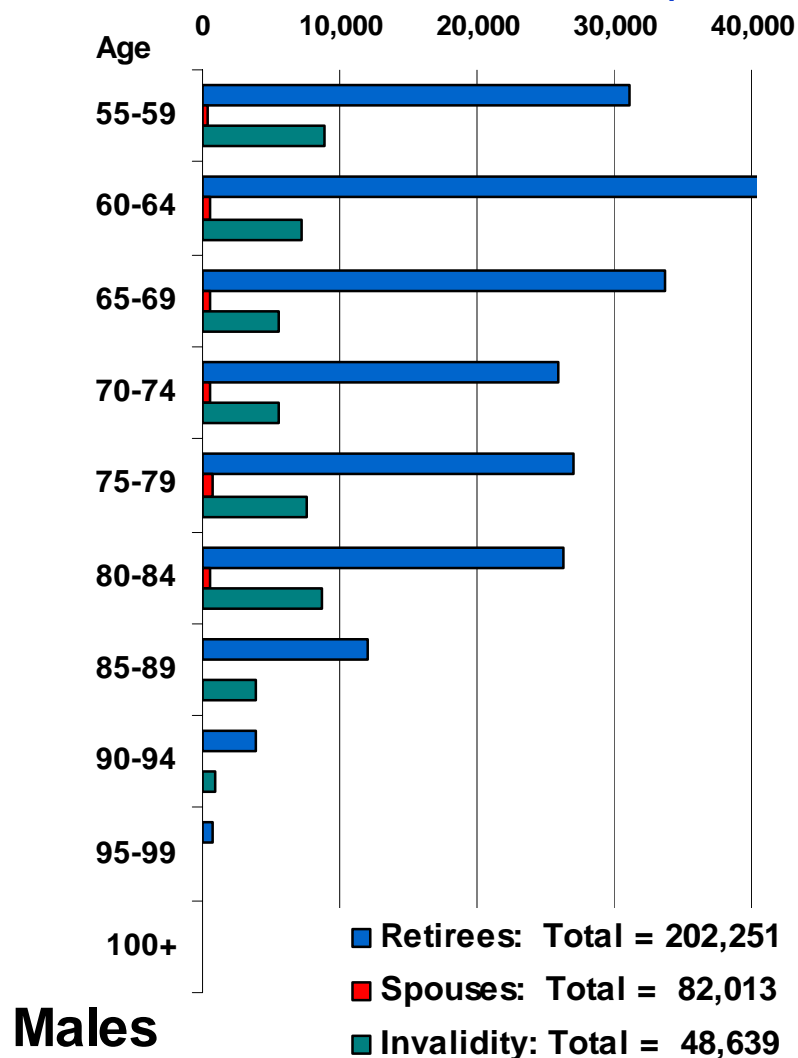
# **Australian Public Sector Schemes included in 2005-2007 update**

- Pooled Fund (NSW)
- Victorian Emergency Services Superannuation Scheme / Victorian State Superannuation Fund
- Government Employees Superannuation Fund (WA)
- Public Sector Superannuation Scheme / Commonwealth Superannuation Scheme (Commonwealth)



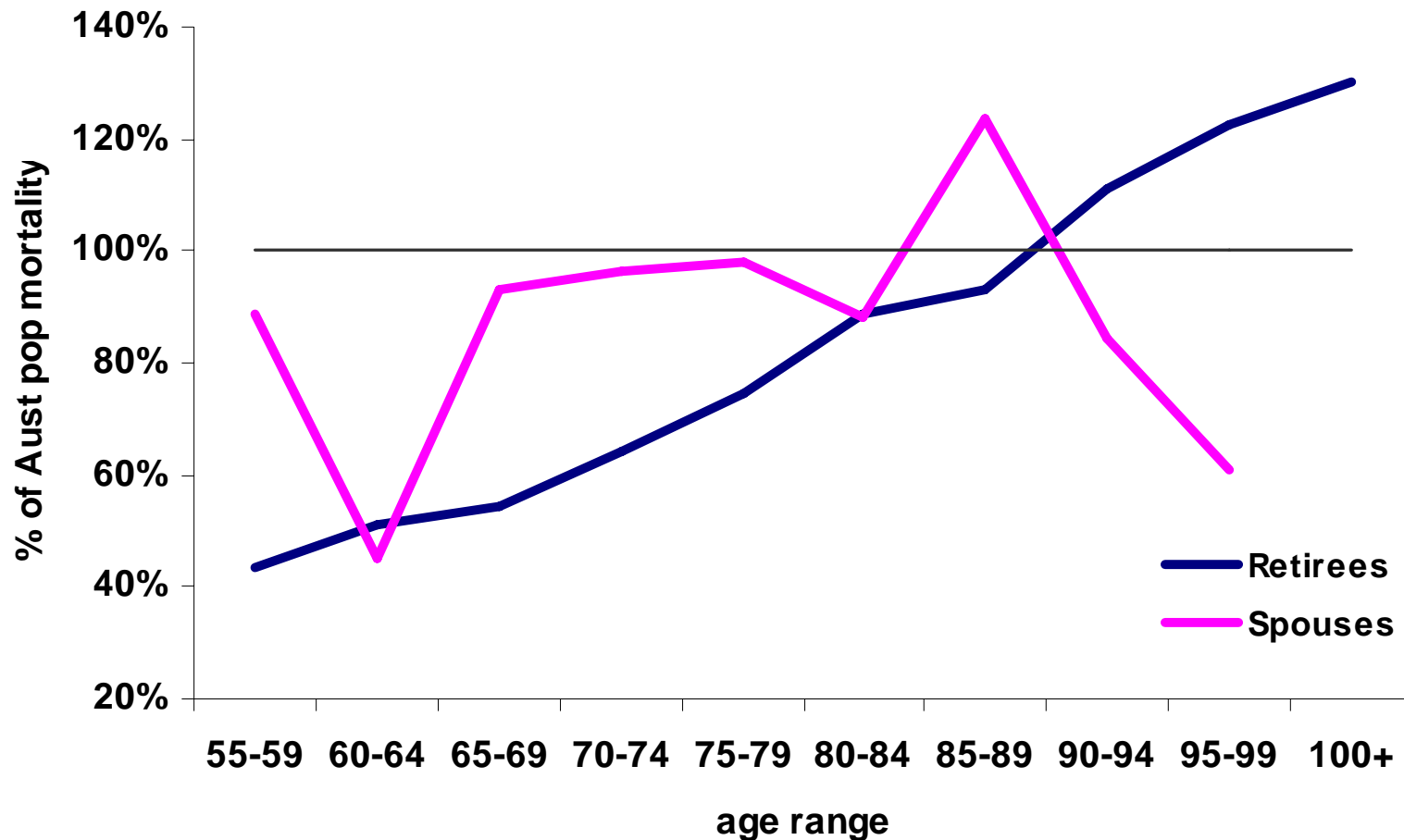


## Years of exposure in 2005-07 data



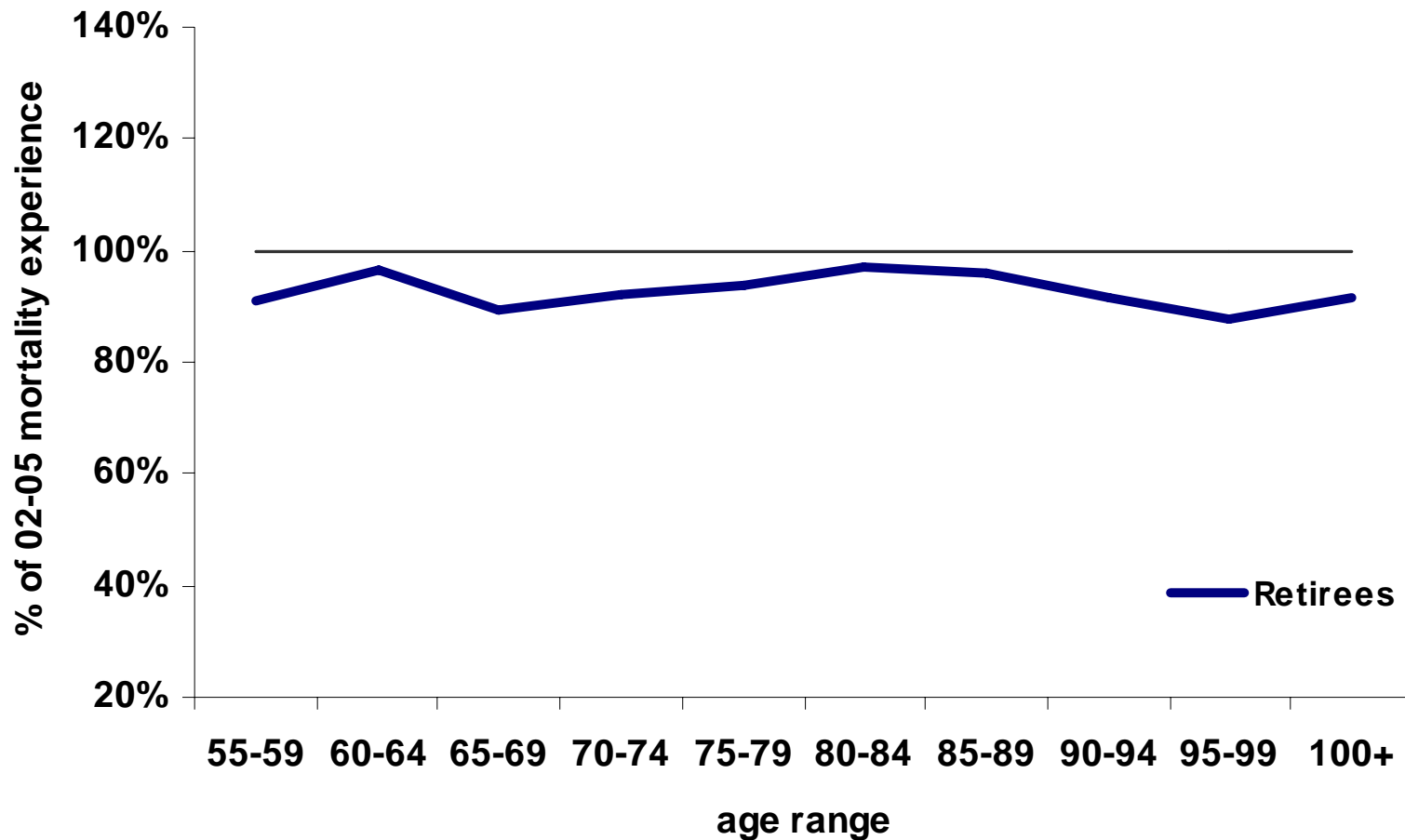


## Male mortality v ALT 2000-02



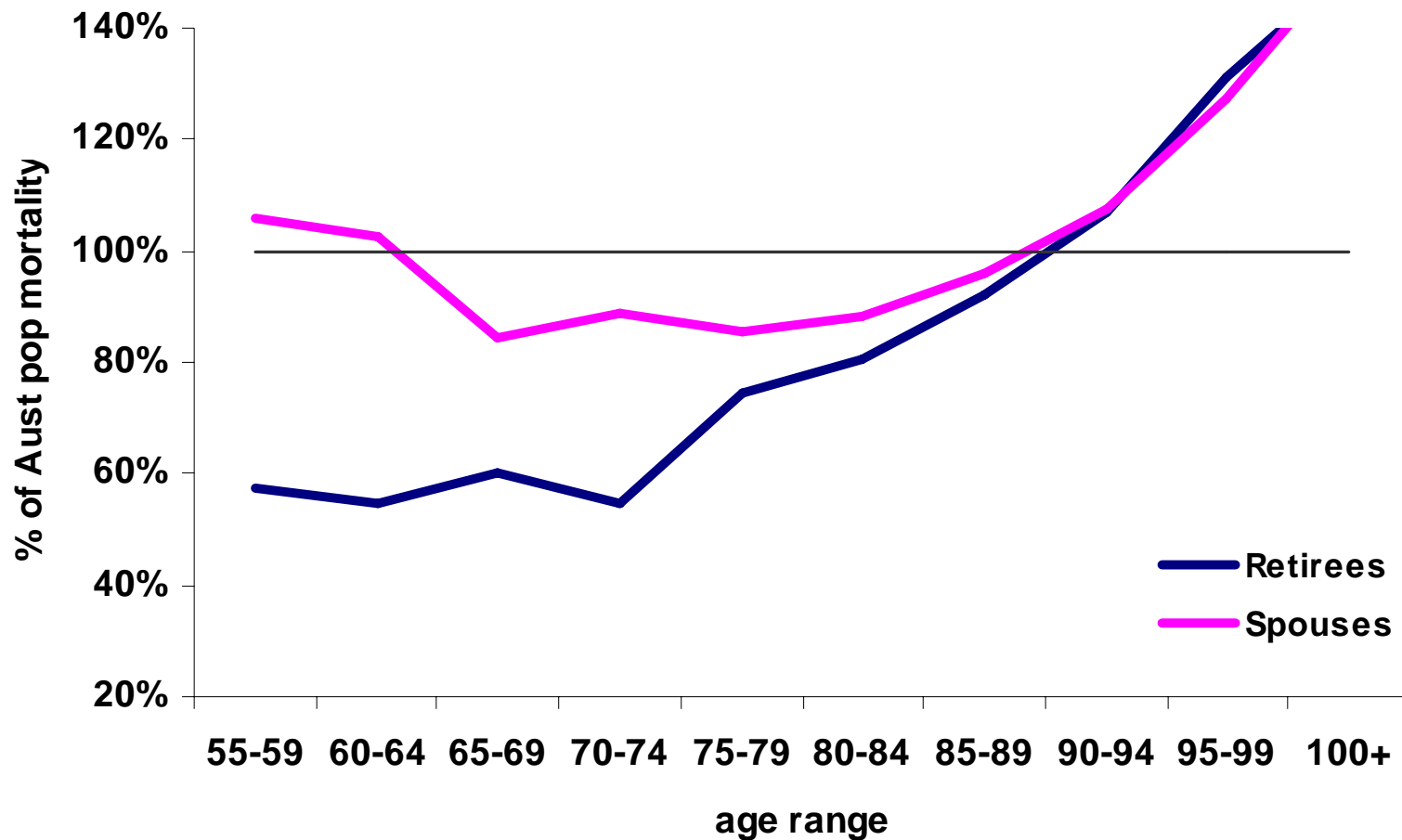


## Male mortality v 2002-05 experience



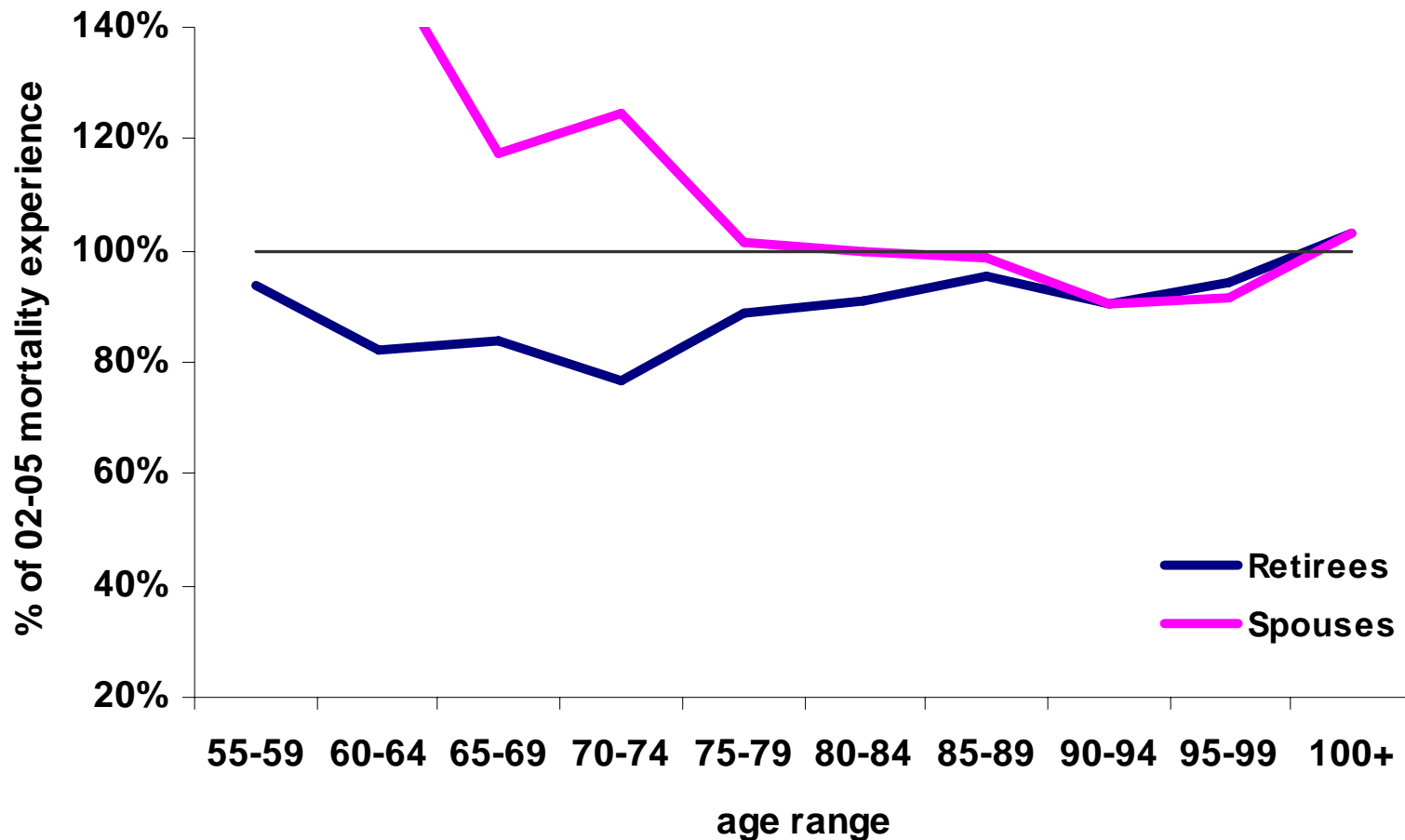


## Female mortality v ALT 2000-02





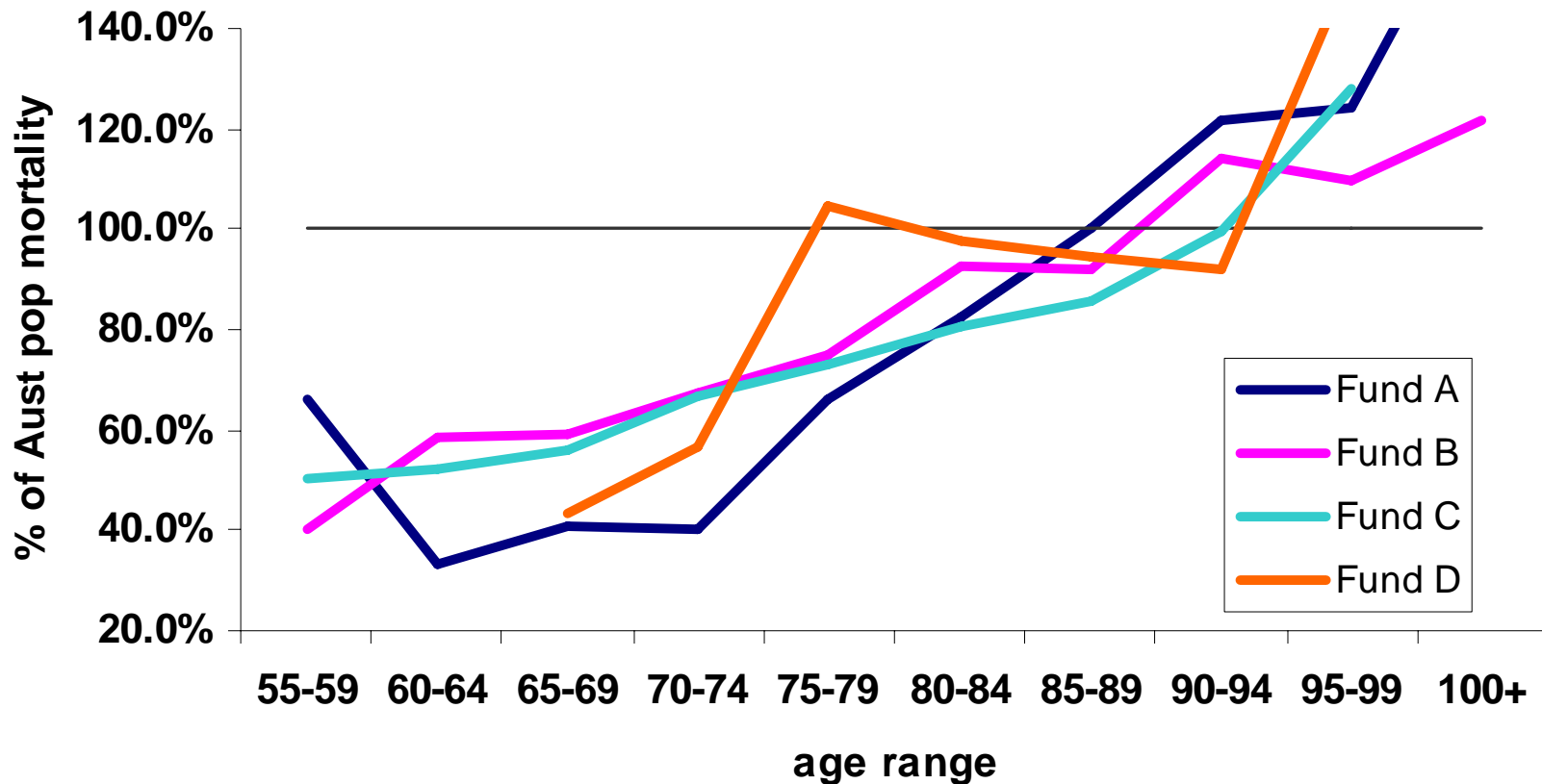
# Female mortality v 2002-05 experience





# Comparison between funds

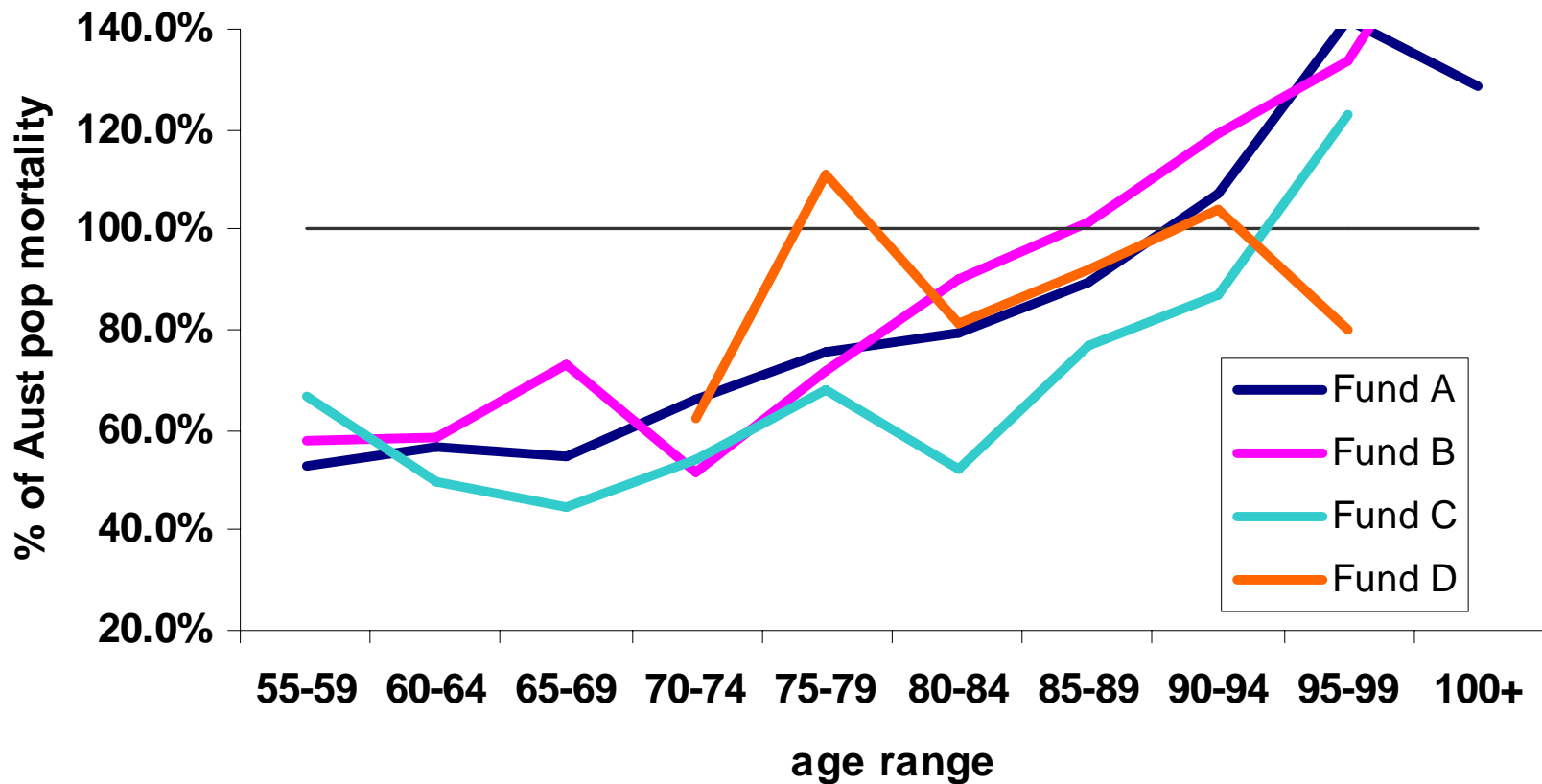
## Male retirees





# Comparison between funds

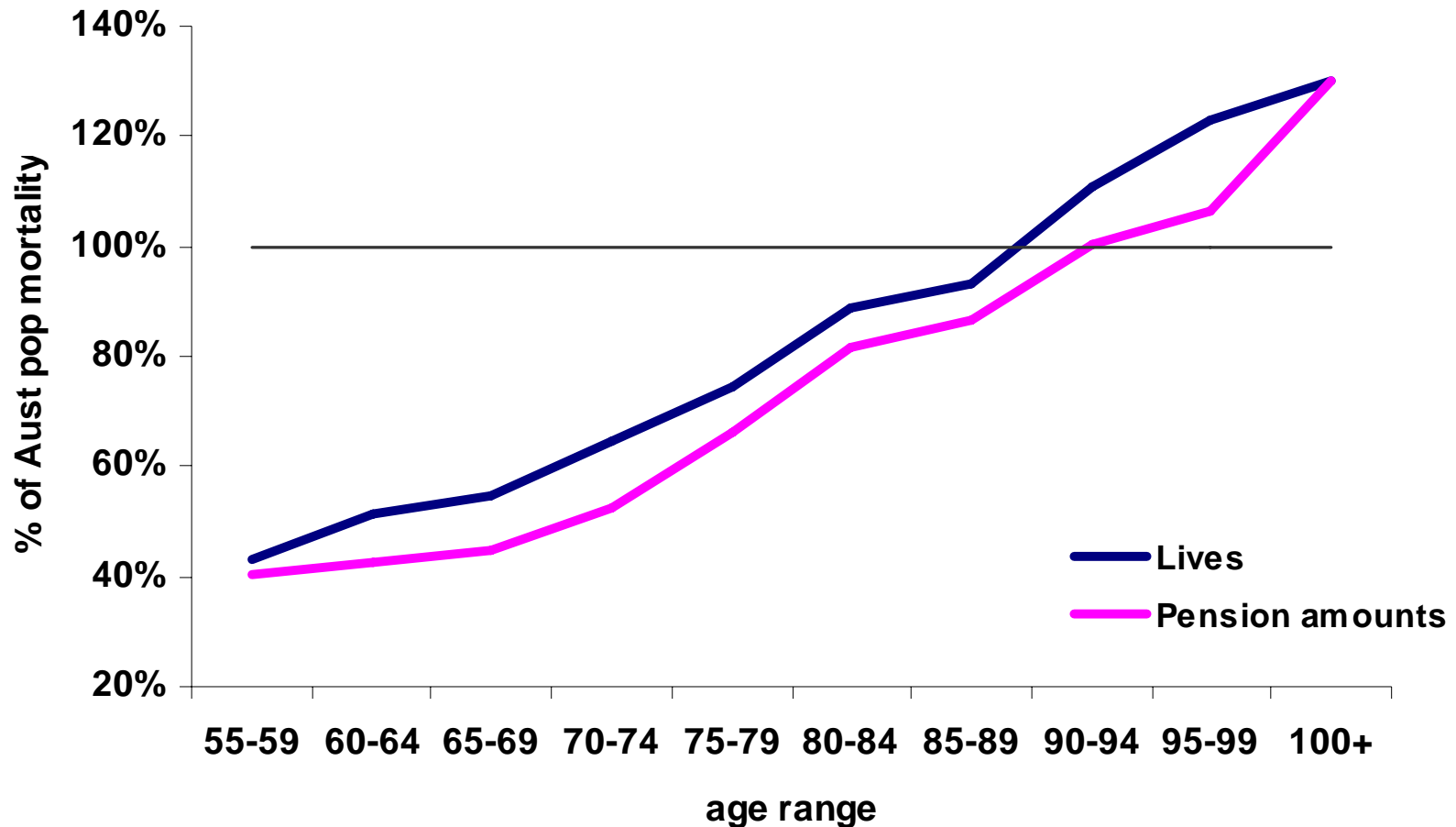
## Female retirees





# Comparison of lives v pensions

## Male retirees

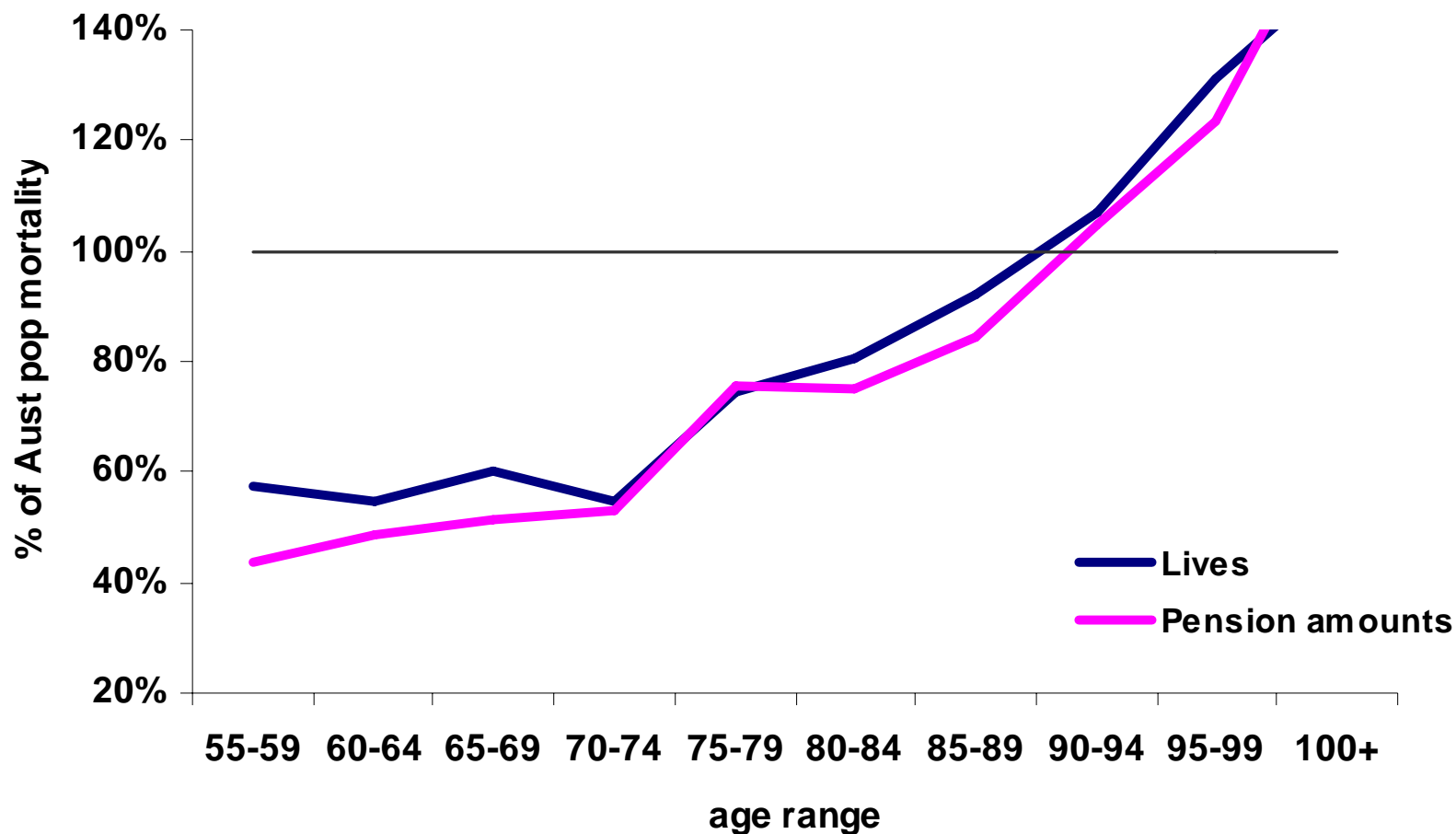






# Comparison of lives v pensions

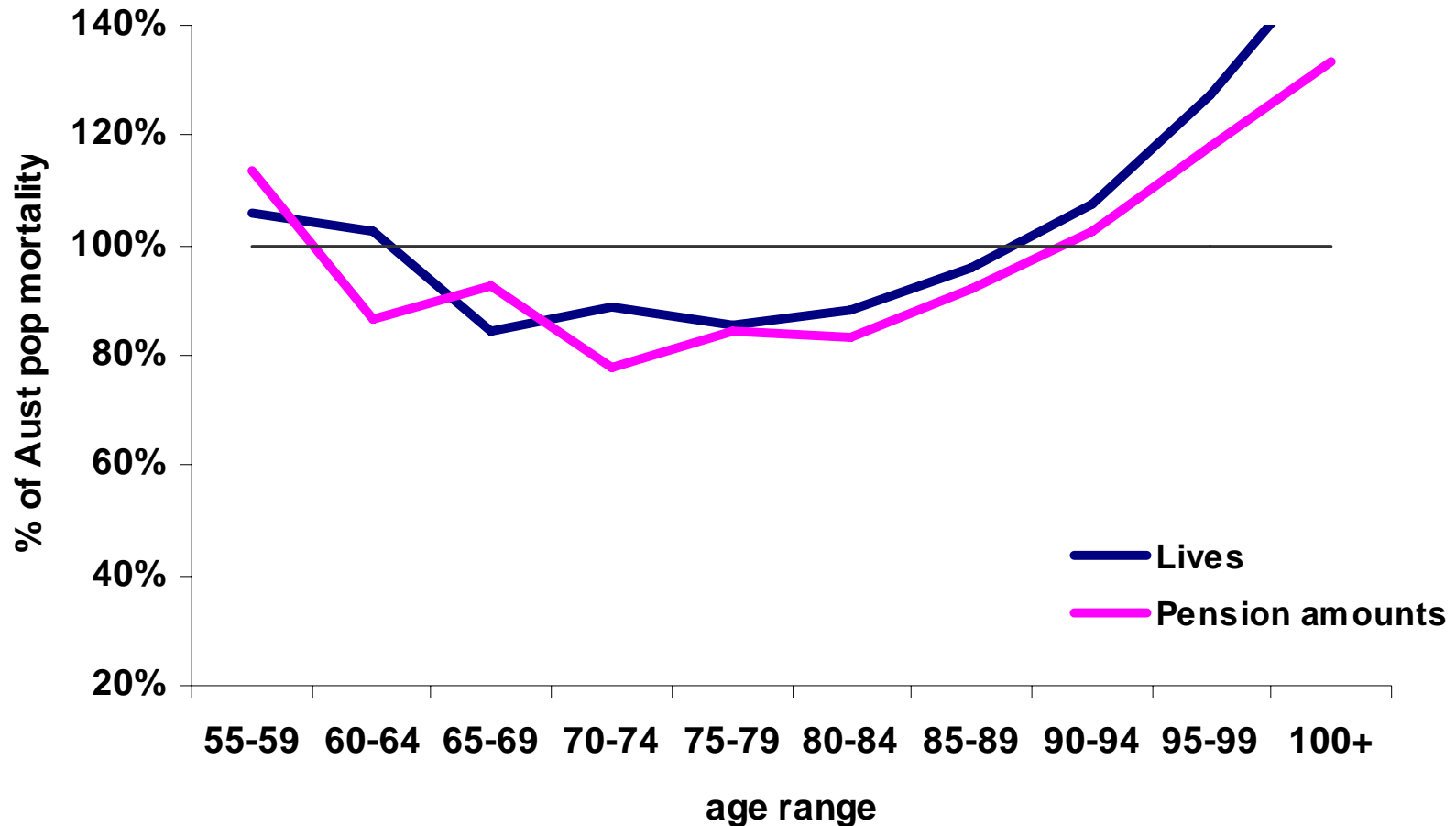
## Female retirees





# Comparison of lives v pensions

## Female spouses



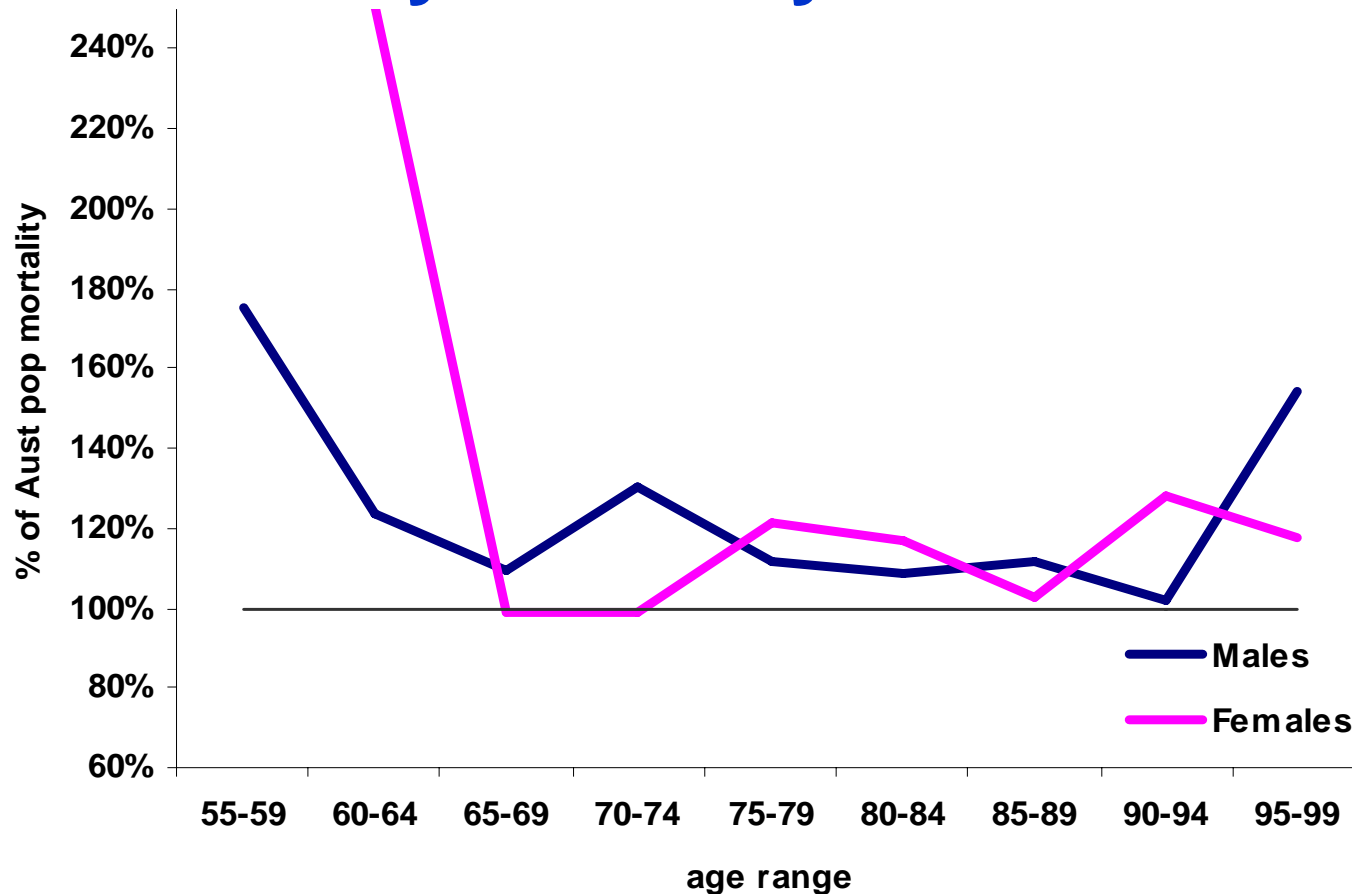


## **Extensions to 2002-05 study**

- **Invalidity pensioner experience**
- **Mortality improvements**
- **Extrapolated results**



## Invalidity mortality v ALT 2000-02

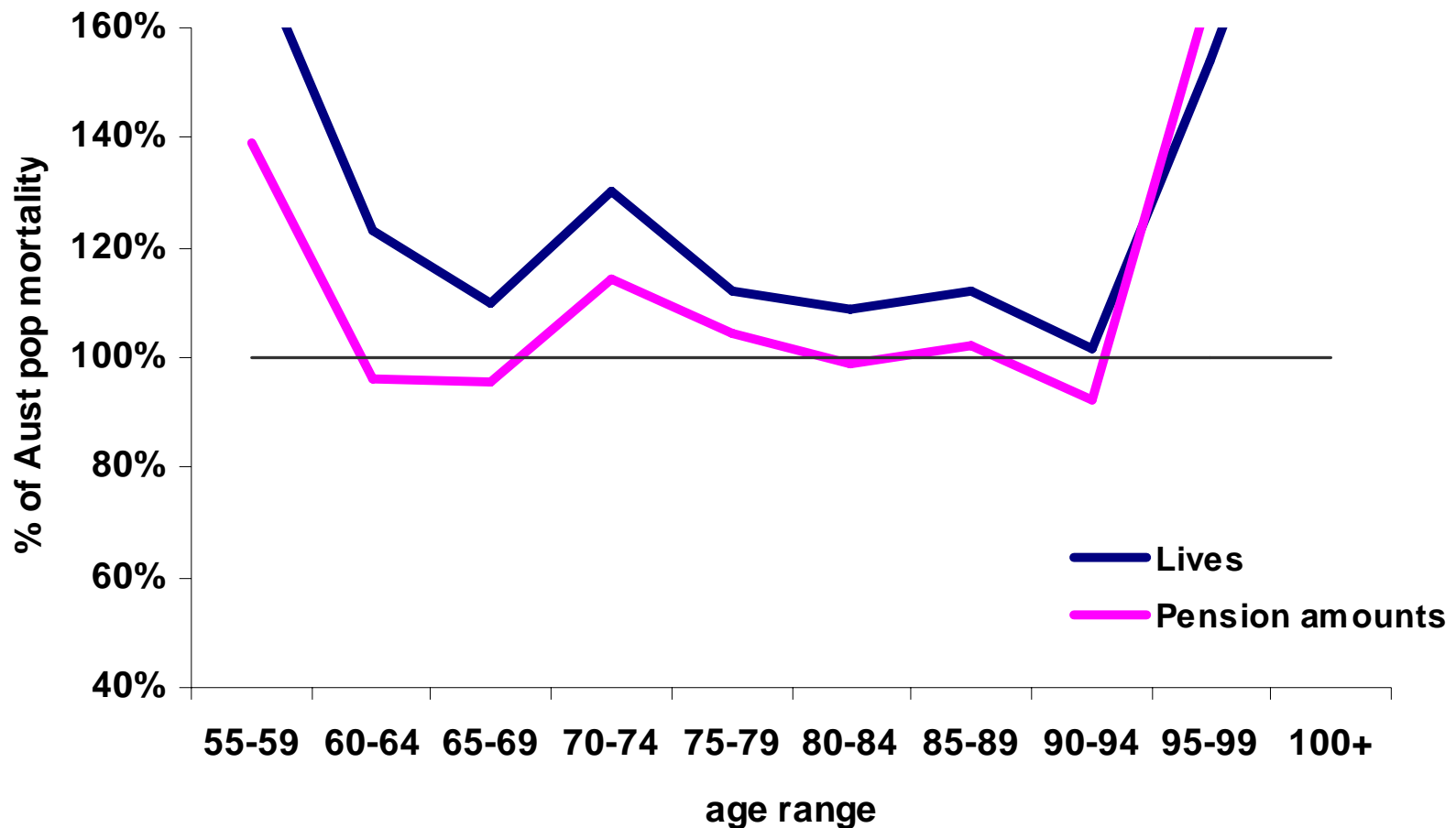


- Anti selection from onset of disability
- Effects of long term invalidity remain throughout.



# Comparison of lives v pensions

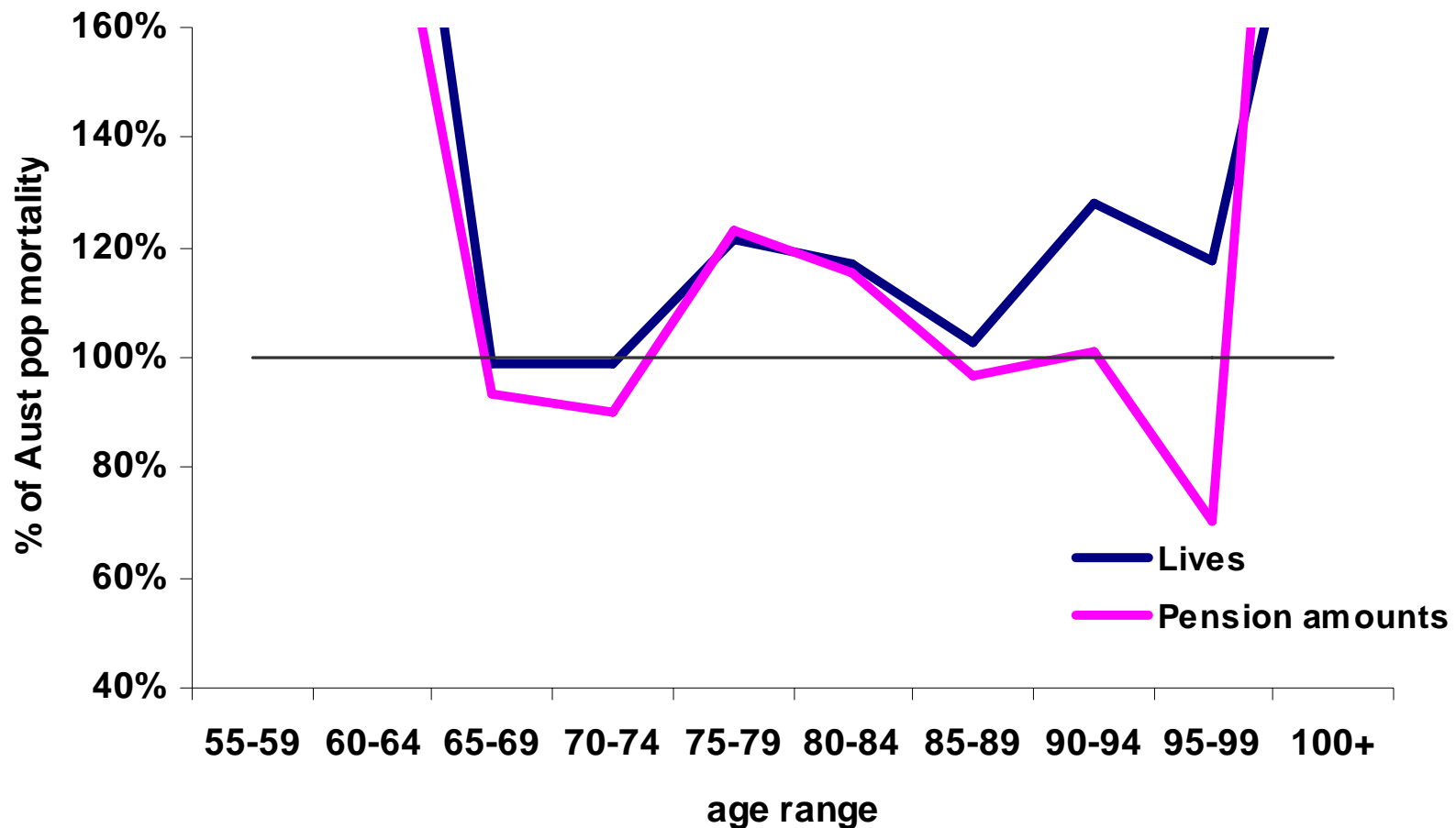
## Male Invalidity pensioners





# Comparison of lives v pensions

## Female Invalidity pensioners



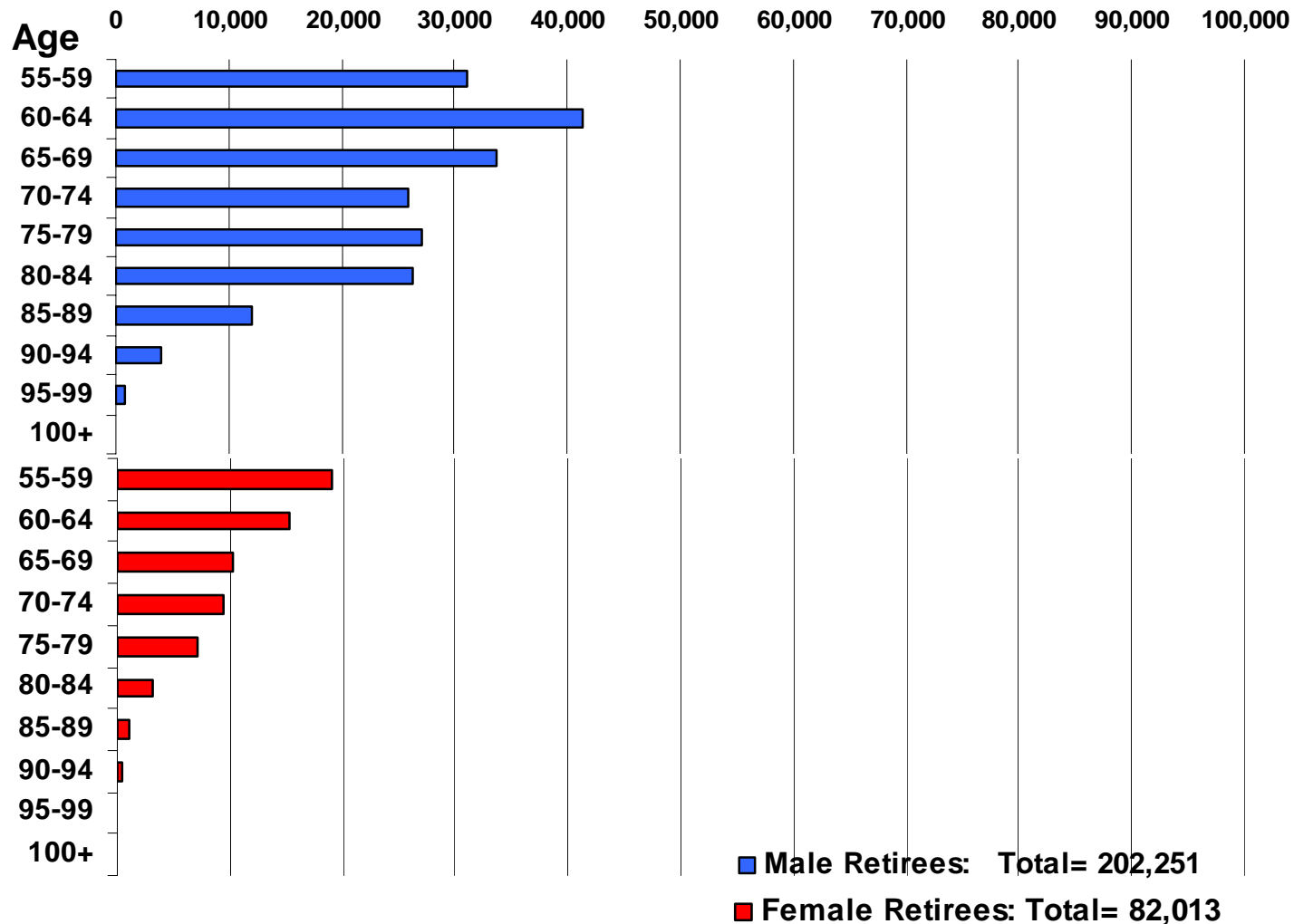


## **Improvement in mortality rates**

- **A significant volume of data is now available**
- **Three year average rates of improvement are less than four year**
- **Generally accelerating trend**
- **More data and more study needed**



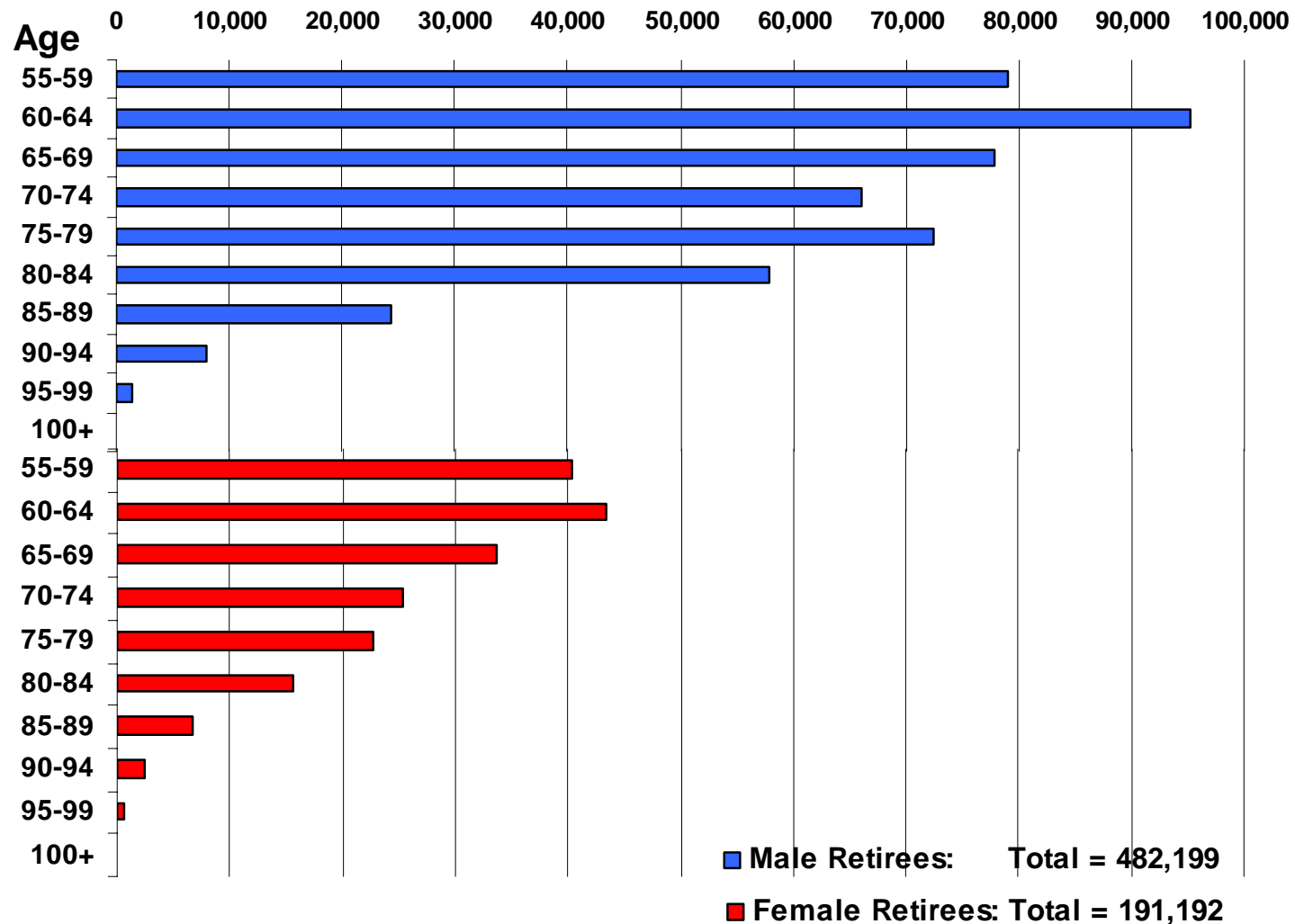
## Years of exposure in 2005-07





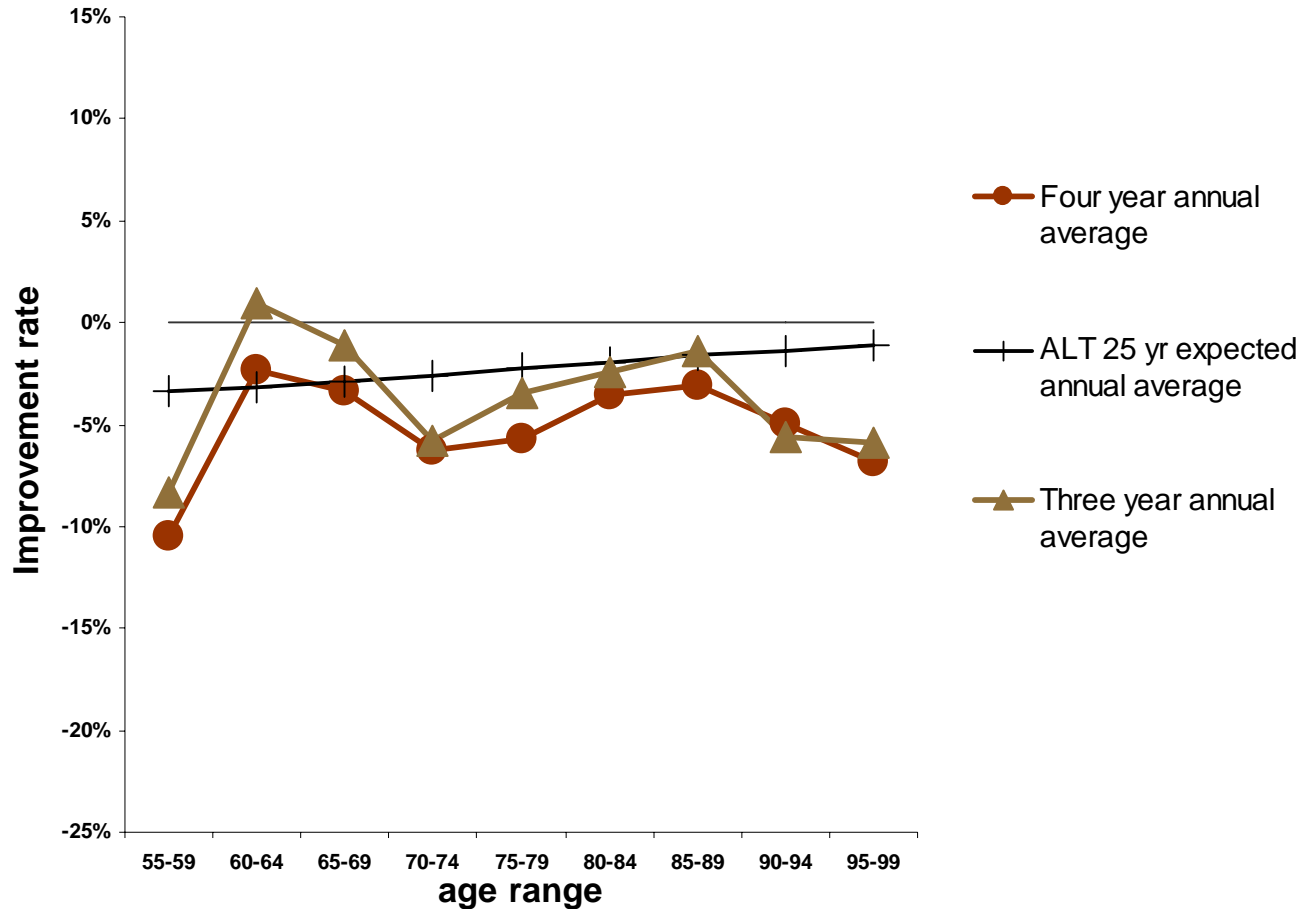


# Years of exposure in 2002-07



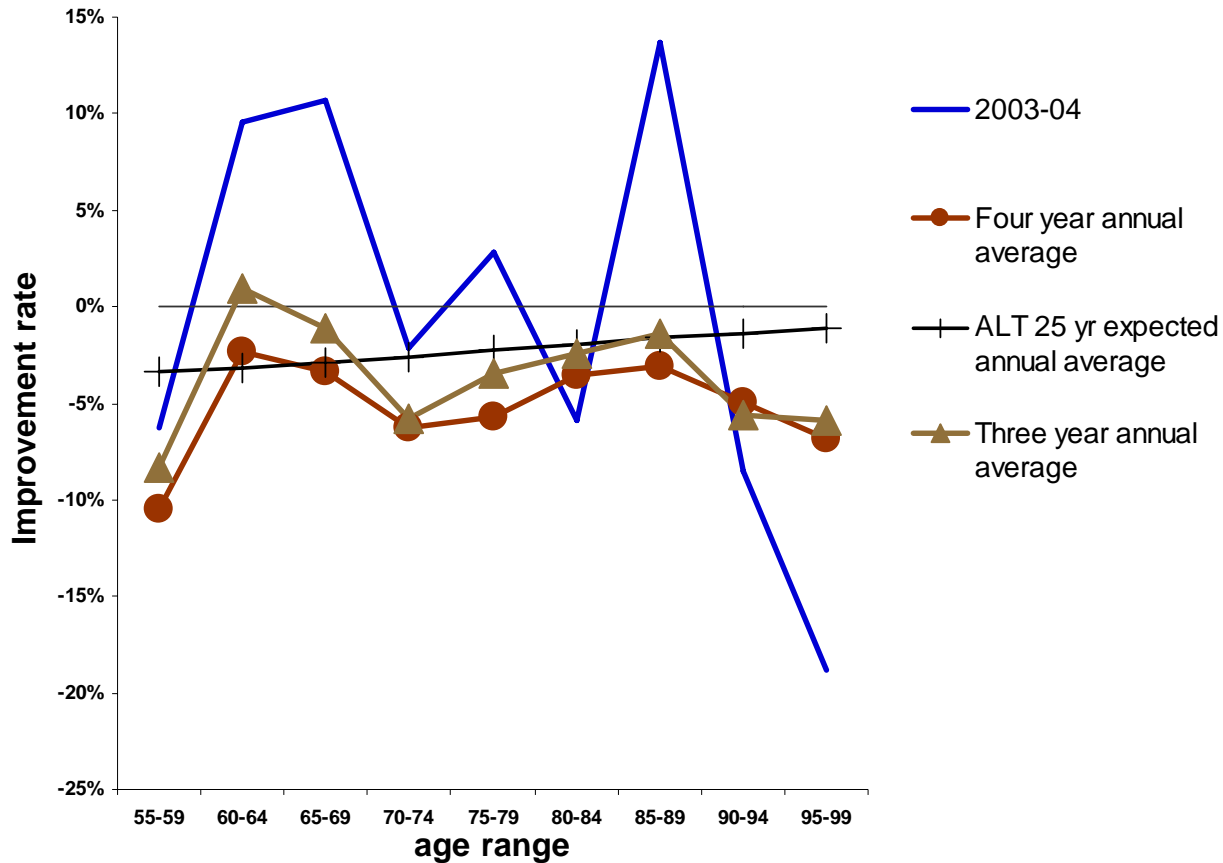


# Improvements – Male Retirees



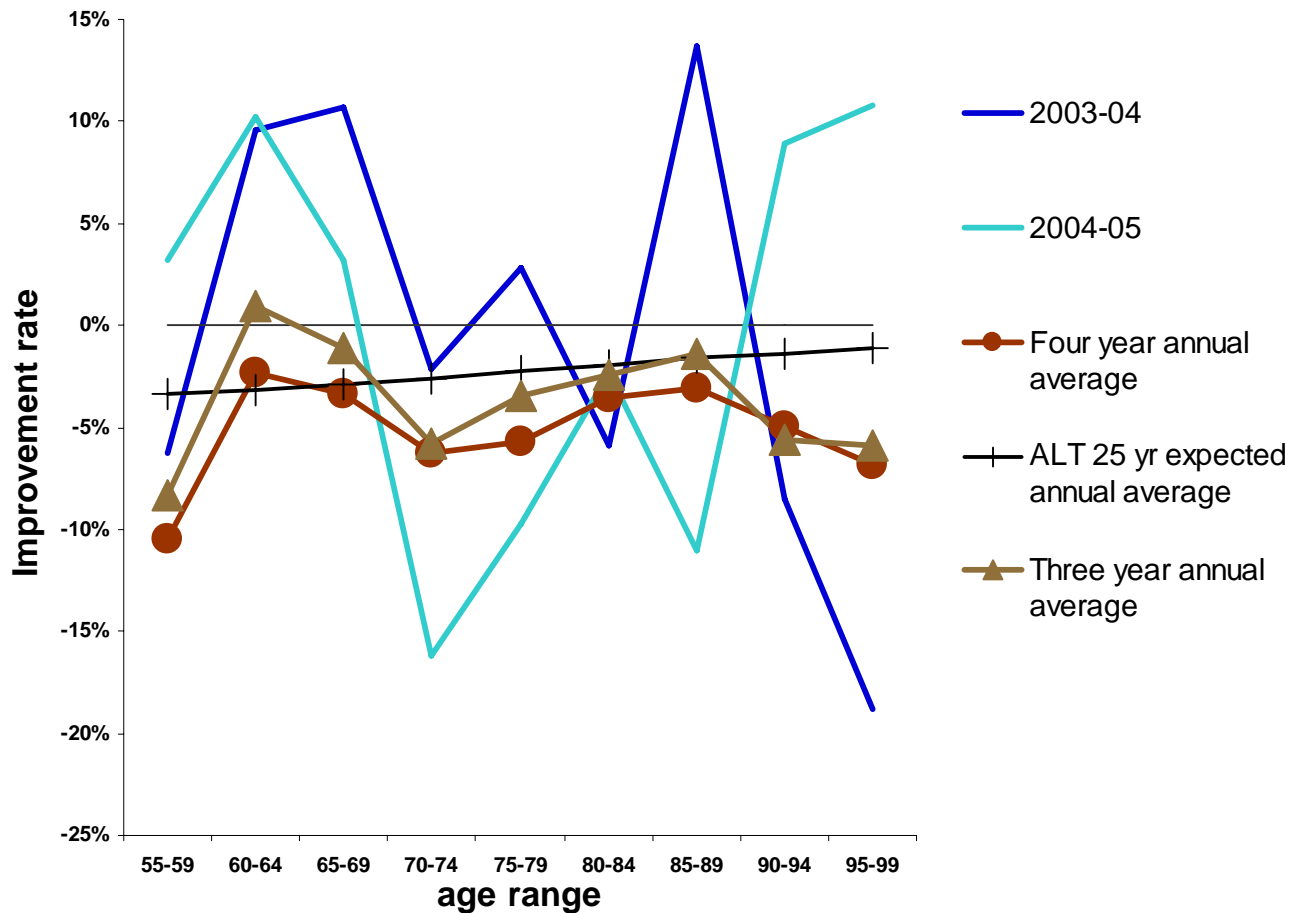


# Improvements – Male Retirees



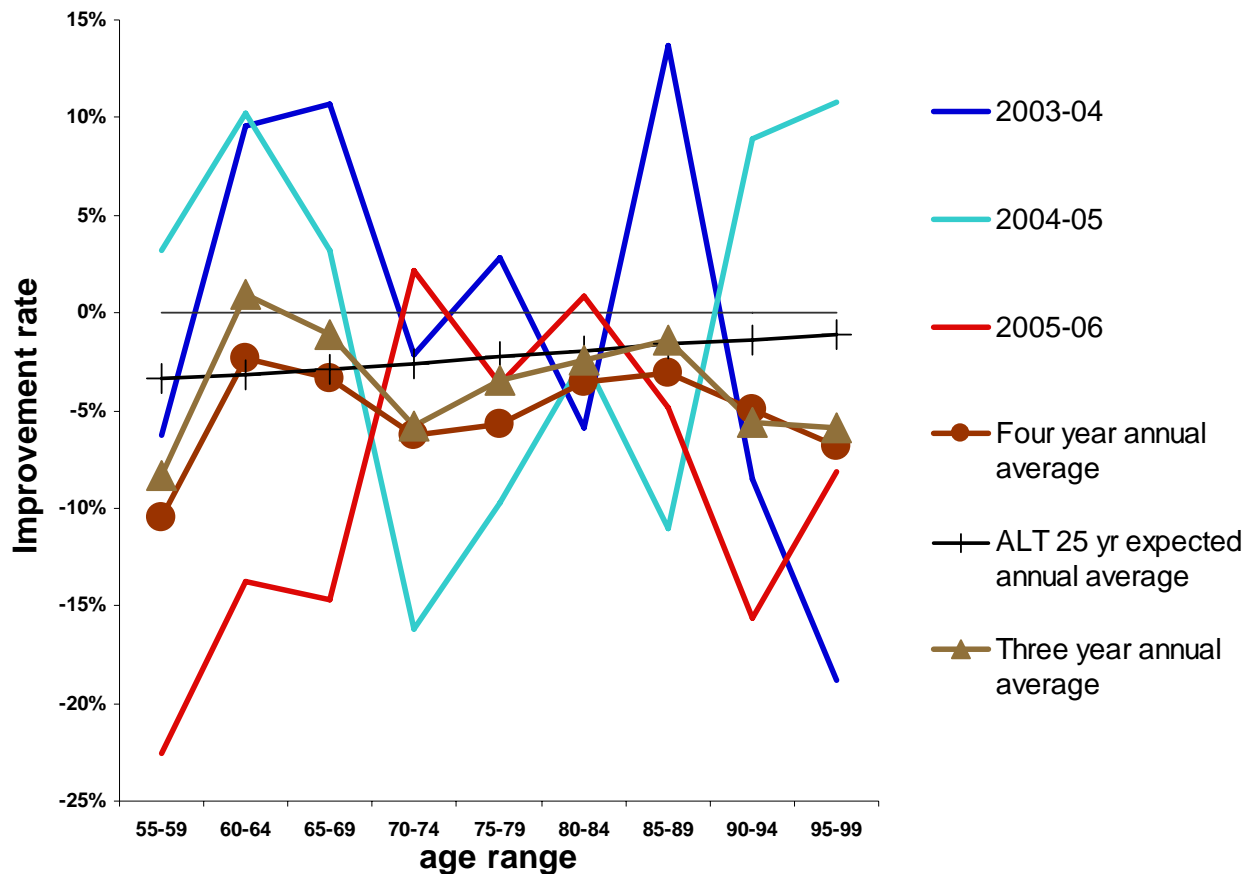


# Improvements – Male Retirees



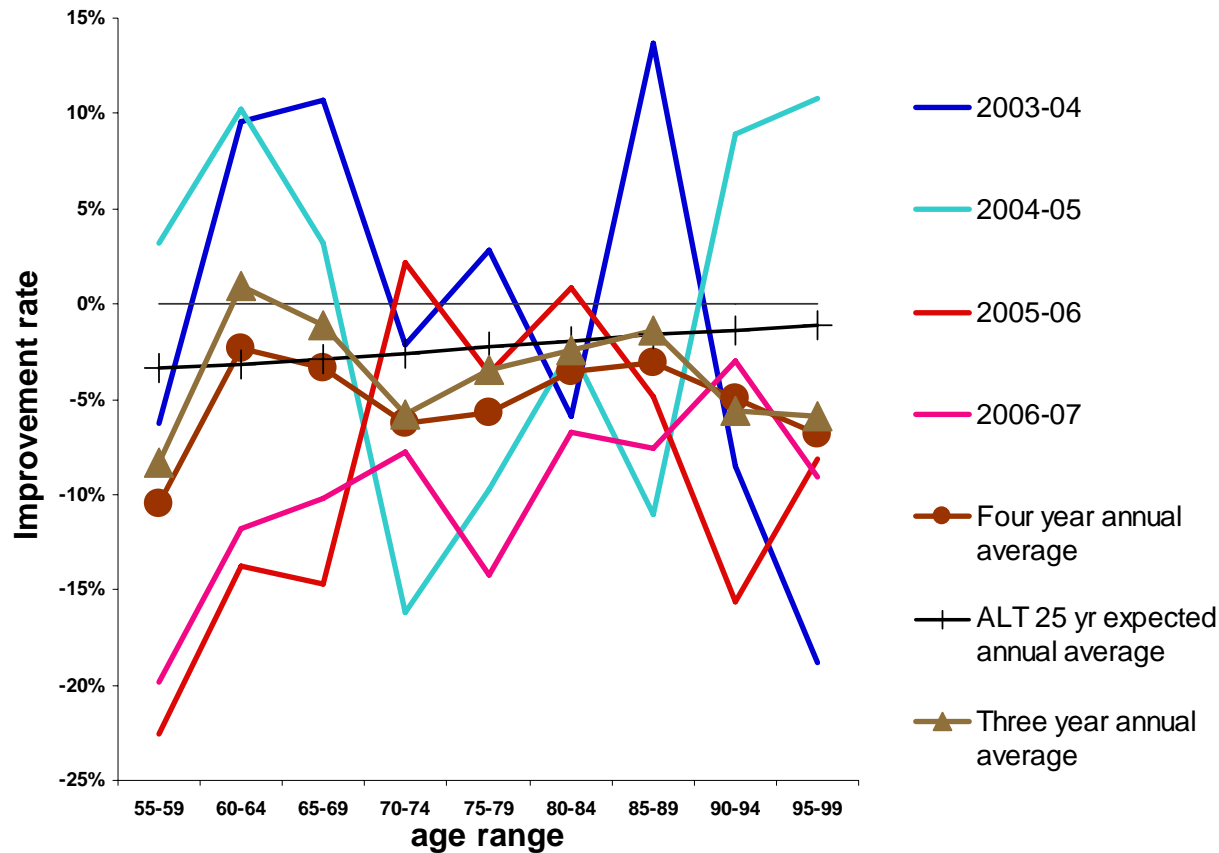


# Improvements – Male Retirees



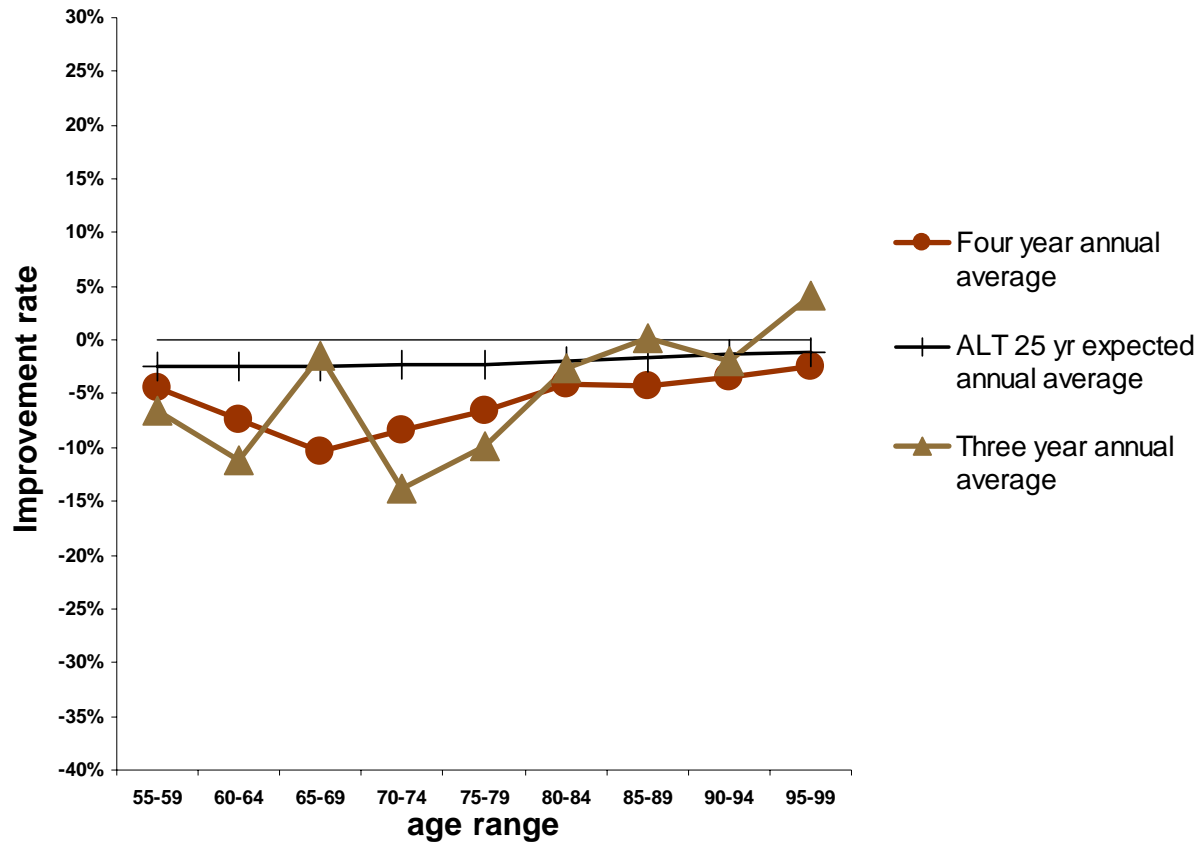


# Improvements – Male Retirees



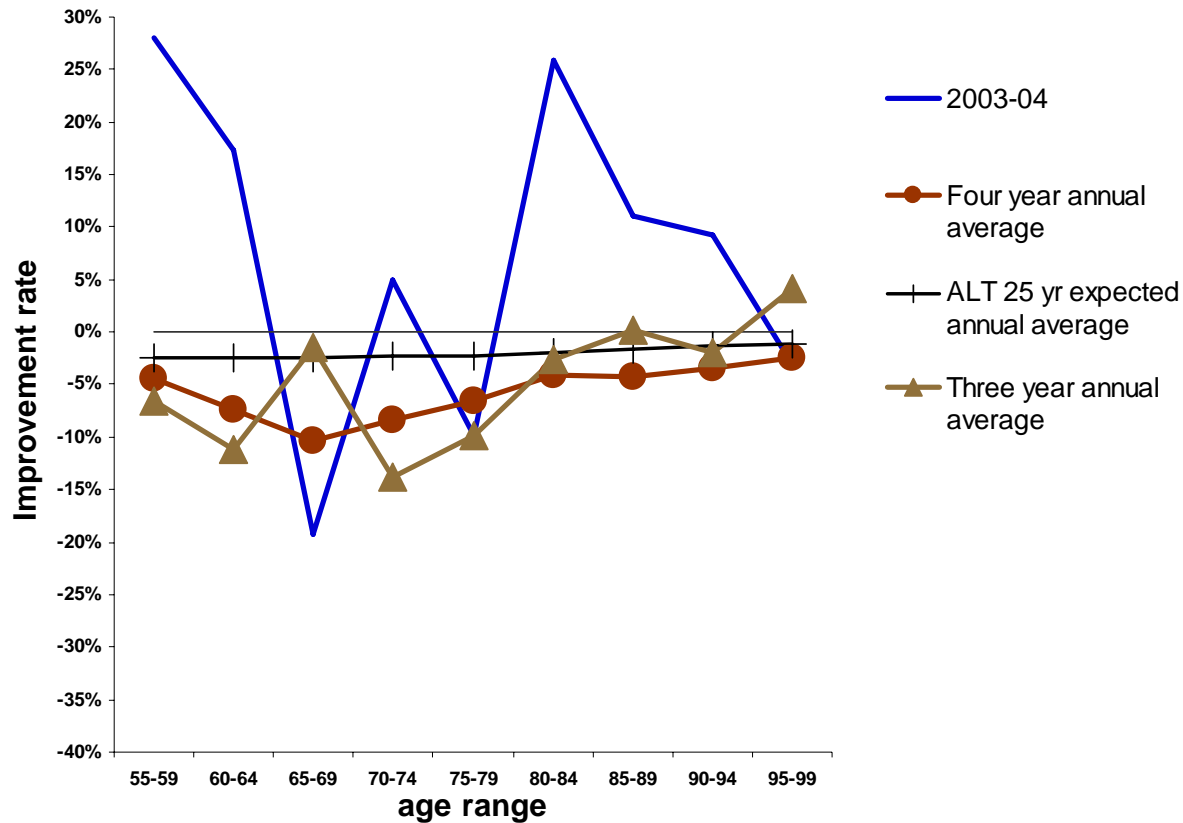


# Improvements – Female Retirees





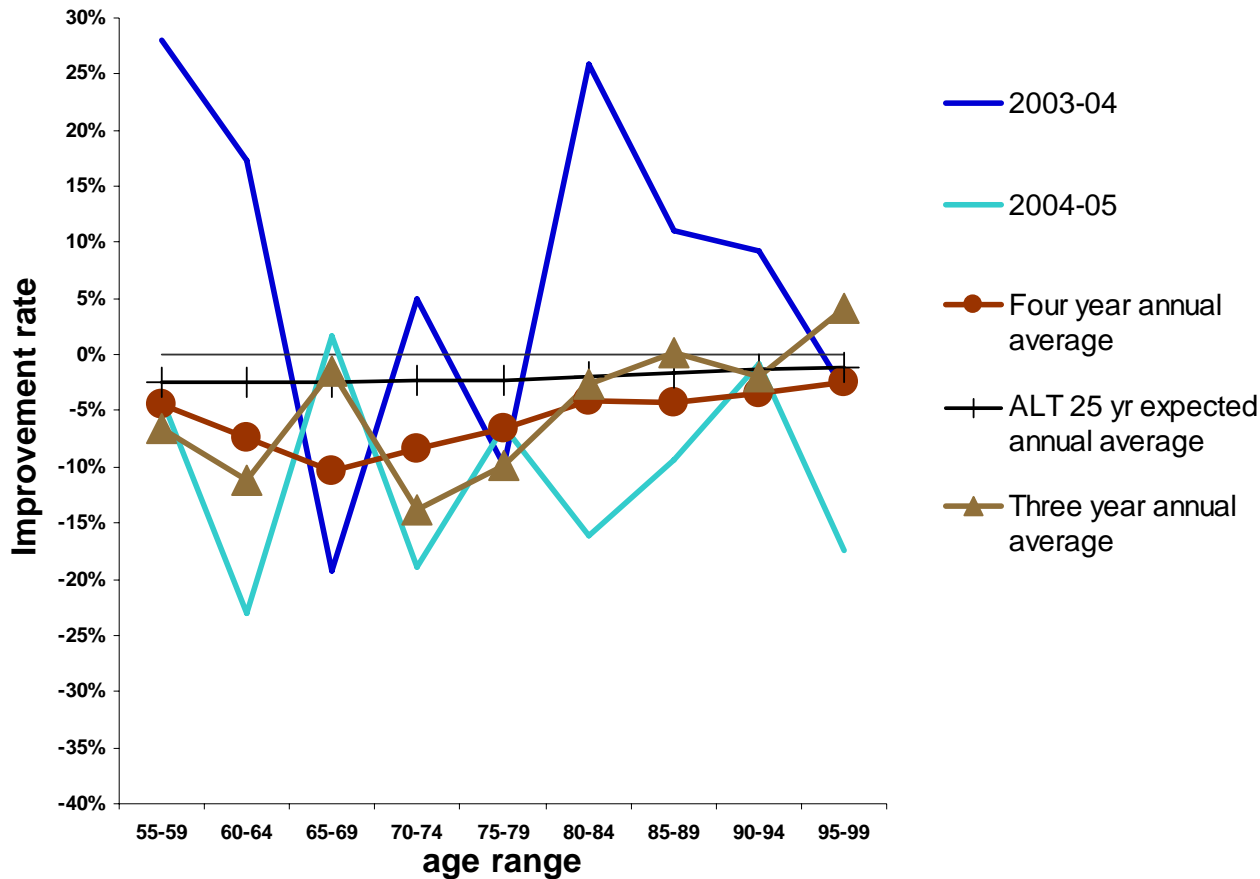
# Improvements – Female Retirees





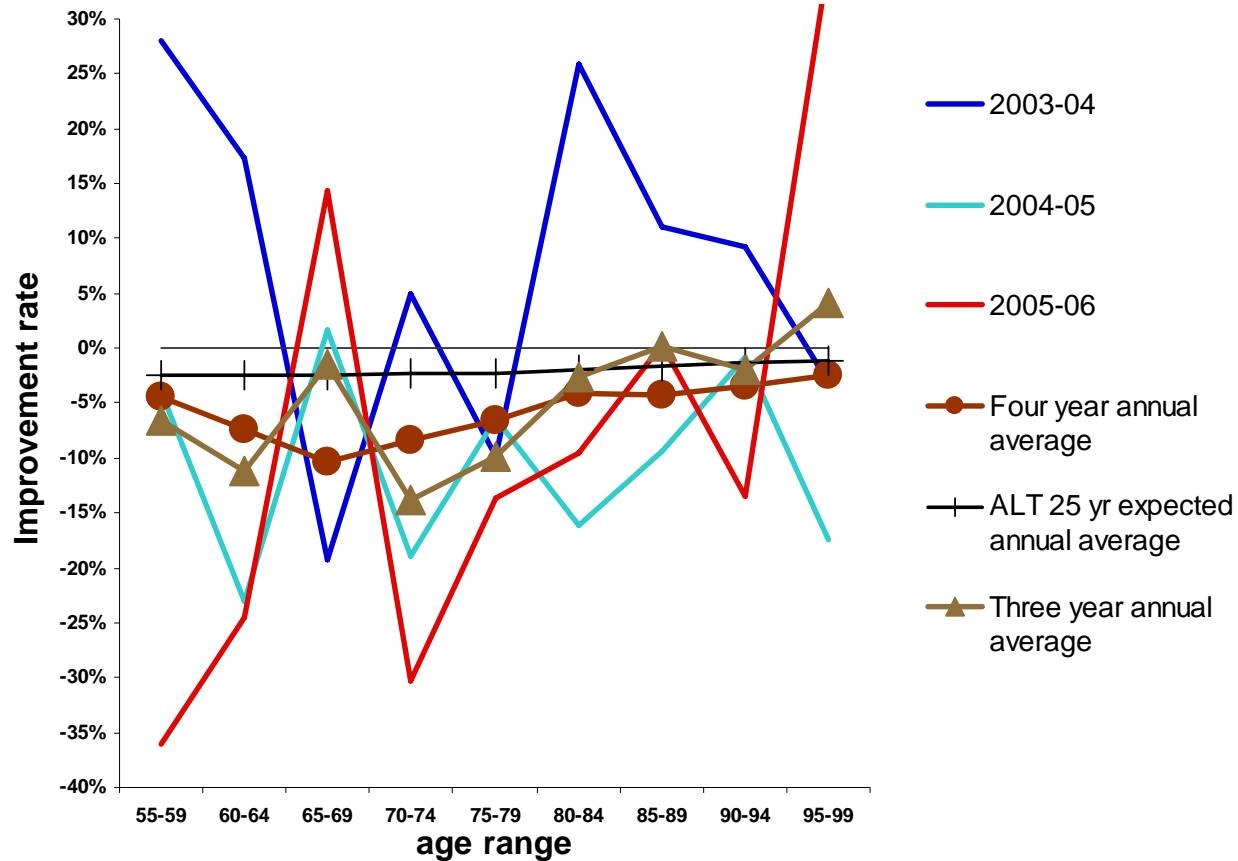


# Improvements – Female Retirees



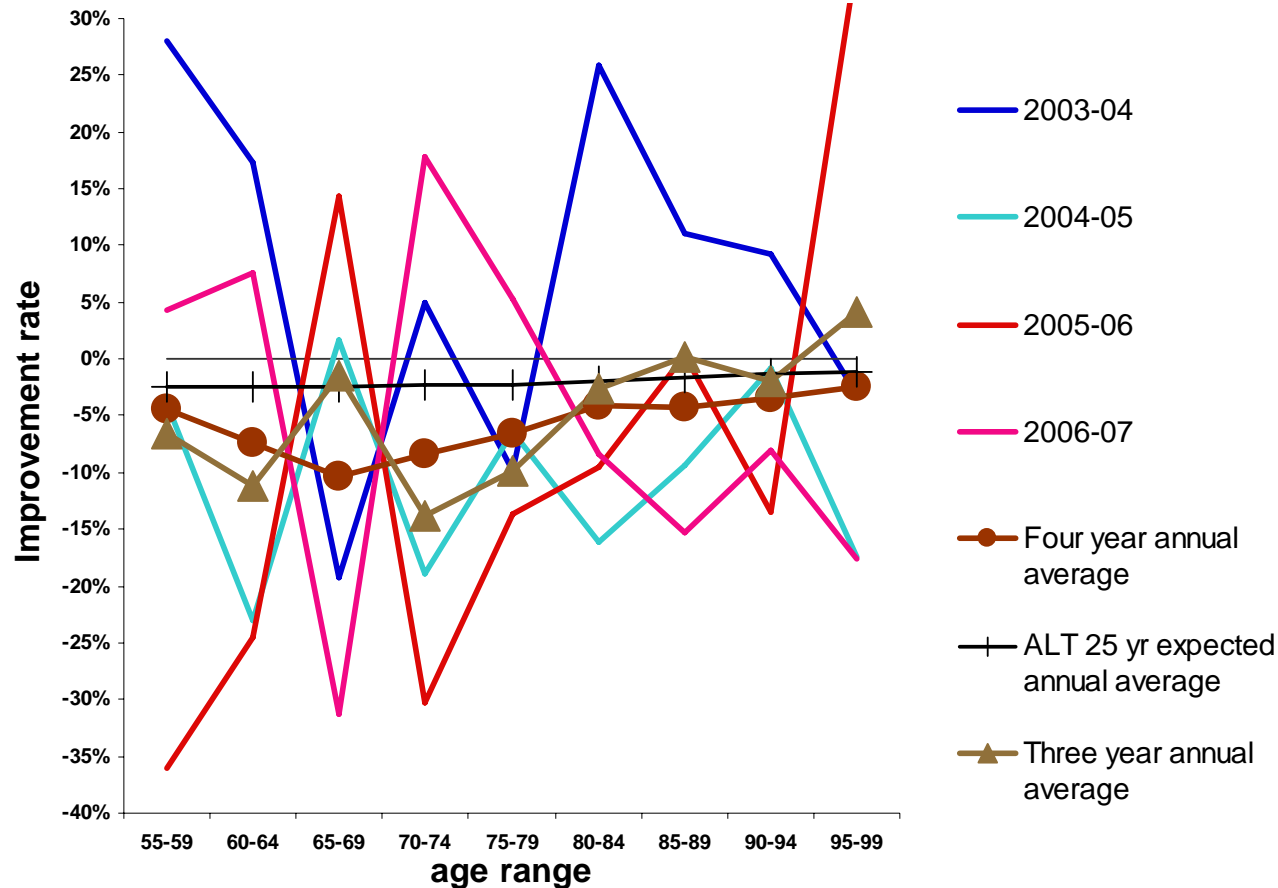


# Improvements – Female Retirees





# Improvements – Female Retirees





## **Some extrapolations using improvement experience**

- **The purpose of studying experience is to use the results to estimate likely future mortality for:**
  - Valuing pension benefits;
  - Estimating the required lump sum to fund retirement benefits;
  - Population projections

**So what are the implications of the experience?**



## Expectation of life from age 65

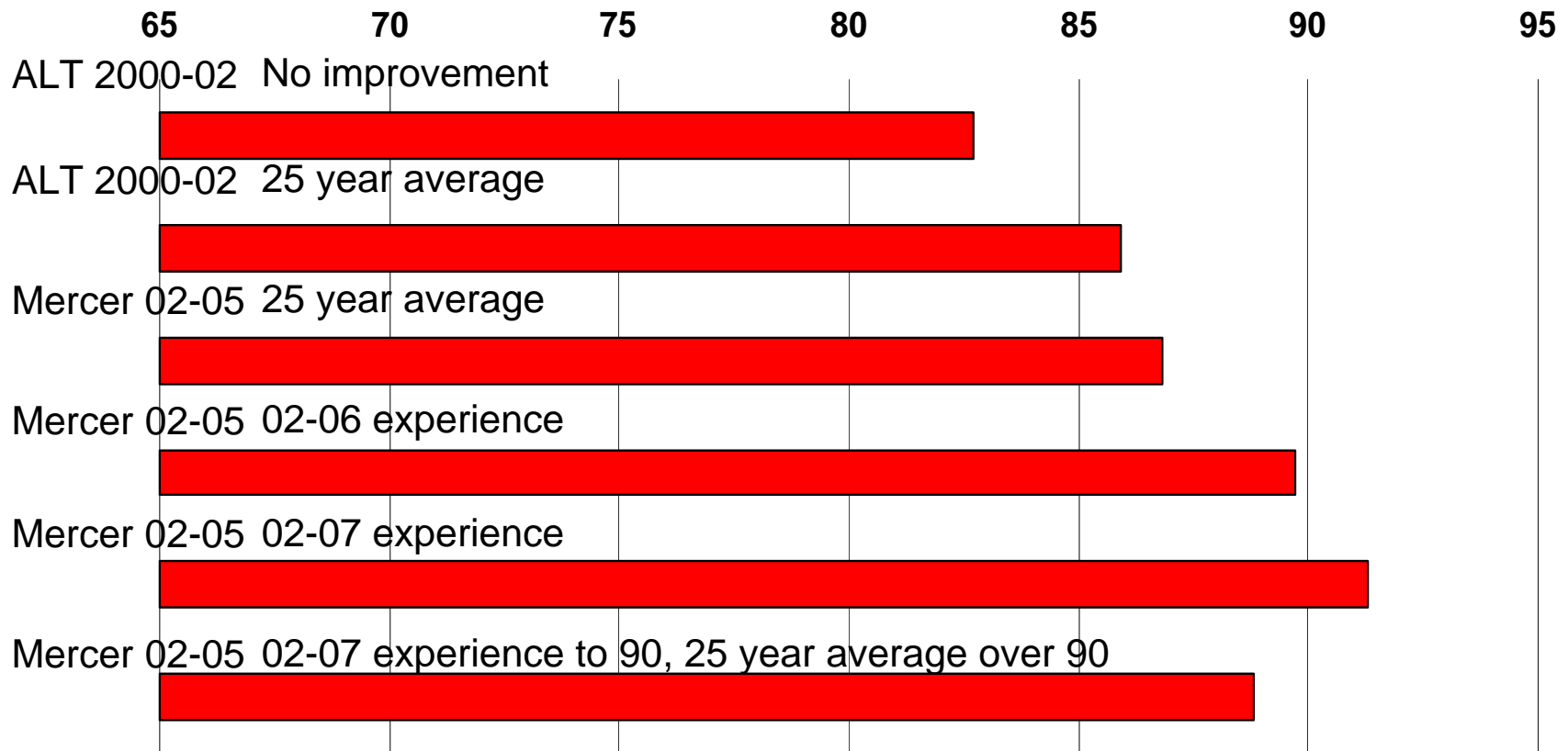
Assumptions		Male	Female
ALT 2000-2002		<b>17.7</b>	<b>21.2</b>
“	+25yr ALT	<b>20.9</b>	<b>24.3</b>
Mercer 02-05	+25yr ALT	<b>21.8</b>	<b>24.6</b>
“	+ 3 yr exper.	<b>24.7</b>	<b>24.6</b>
“	+ 4 yr exper.	<b>26.3</b>	<b>28.4</b>
“	+ 4 yr exper. to 90, 25yr ta	<b>23.8</b>	<b>27.0</b>



# Extrapolating Improvements

Males “Expectation of life” for current 65 year old under various assumptions

Projected average life span from 65

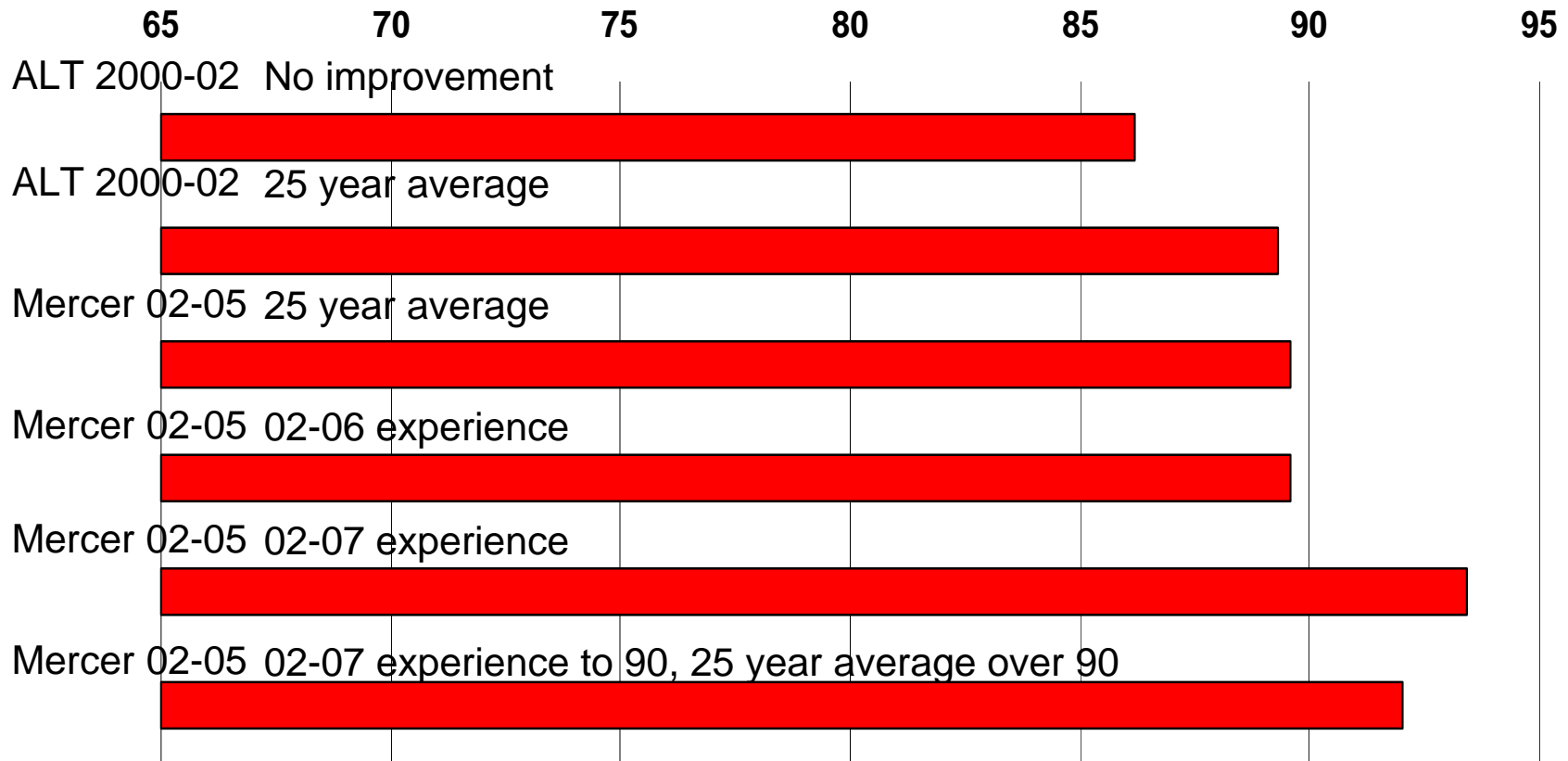




# Extrapolating Improvements

Females "Expectation of life" for current 65 year old under various assumptions

Projected life span at 65





## Value of \$1 lifetime pension at age 65

Assumptions		Male	Female
ALT 2000-2002		<b>10.23</b>	<b>11.44</b>
“	+25yr ALT	<b>11.15</b>	<b>12.22</b>
Mercer 02-05	+25yr ALT	<b>11.65</b>	<b>12.45</b>
“	+ 3 yr exper.	<b>12.16</b>	<b>12.69</b>
“	+ 4 yr exper.	<b>12.57</b>	<b>13.33</b>
“	+ 4 yr exper to 90, 25yr ta	<b>12.21</b>	<b>13.12</b>





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## **International Actuarial Association IAA Mortality Task Force**



## **Need for mortality investigations**

- **Increased longevity**
- **Stress on defined benefit funds**
- **Stress on Social Security systems**
- **Gap in defined contribution arrangements**
- **Solvency / capital adequacy for life offices**



## Opportunity for IAA

- **Aggregation of knowledge**
- **Maintain relevance of actuarial profession**



# Formation of Task Force Commenced on 29 January 2008

Task Force Members		
Martin Stevenson	Chairperson	Institute of Actuaries of Australia
Bill Horbatt	Vice Chairperson	Society of Actuaries (USA)
Henk van Broekhoven	Vice Chairperson	Netherlands
Peter Ying	Actuarial Institute of Chinese Taipei	
Brian Ridsdale	Institute of Actuaries and Faculty of Actuaries	
John Armstrong	Society of Actuaries in Ireland	
Chresten Dengsoe	Den Danske Aktuarforening	
Erik Alm	Svenska Aktuarieforening	
Mika Makinen	Suomen Aktuaarigyhdistis	
Helge-Ivar Magnussen	Norwegian Actuarial Association (Not official)	
Yoshihiro Takahashi	Institute of Actuaries of Japan	
Bob Howard	Canadian Institute of Actuaries	



## Terms of Reference

- To conduct a study of current data collection efforts internationally and to create guidelines to ensure that appropriate data is available.
- To coordinate the work done by different Sections and Committees of the IAA in the area of mortality, especially when this involves cooperation with other international bodies.
- To conduct a survey of current international research on mortality to determine future needs in this area and begin to facilitate a process to enhance future efforts of actuaries in this area.
- To propose how actuaries could take a leading role in international research on mortality by acting as the initiator and coordinator of such research.



## “All inclusive” Principle

- Improvement
- Pandemics
- Uncertainty
- Social and demographic stratification
- Analysis by cause of death
- Graduation techniques
- Projection techniques
- Data availability
- Data accessibility
- Use of population data when industry or practice specific data is not available.



# Timetable

- |   |  |                  |
|---|--|------------------|
| • | Introductory meeting by telephone  | Early April 2008 |
| • | Meeting in Quebec City   | 14 June 2008     |
| • | Draft Report on mortality studies by actuarial associations and other actuarial entities / Meeting in Cyprus   | 4 November 2008  |
| • | Final Report on mortality studies by actuarial associations and other actuarial entities / Draft report on mortality studies by non-actuaries / Meeting in Estonia | 30 May 2009      |



## Timetable (cont'd)

- Final Report on mortality studies by non-actuaries / Draft report on guidelines for data, future needs and recommendations about future directions of actuarial involvement / meeting in New Delhi 15 November 2009
- Final Report on guidelines for data, future needs and recommendations and future directions of actuarial involvement / presentation at ICA 2010, Cape Town 7 March 2010