



Bureau du surintendant  
des institutions financières  
Bureau de l'actuaire en chef

Office of the Superintendent  
of Financial Institutions  
Office of the Chief Actuary



# ***Mortality of Canada Pension Plan and Old Age Security Beneficiaries: Implications for Public Pensions***



ISSA • AISS • IVSS

**14<sup>th</sup> International Conference of Social Security  
Actuaries and Statisticians**

23 September 2003



# Presentation

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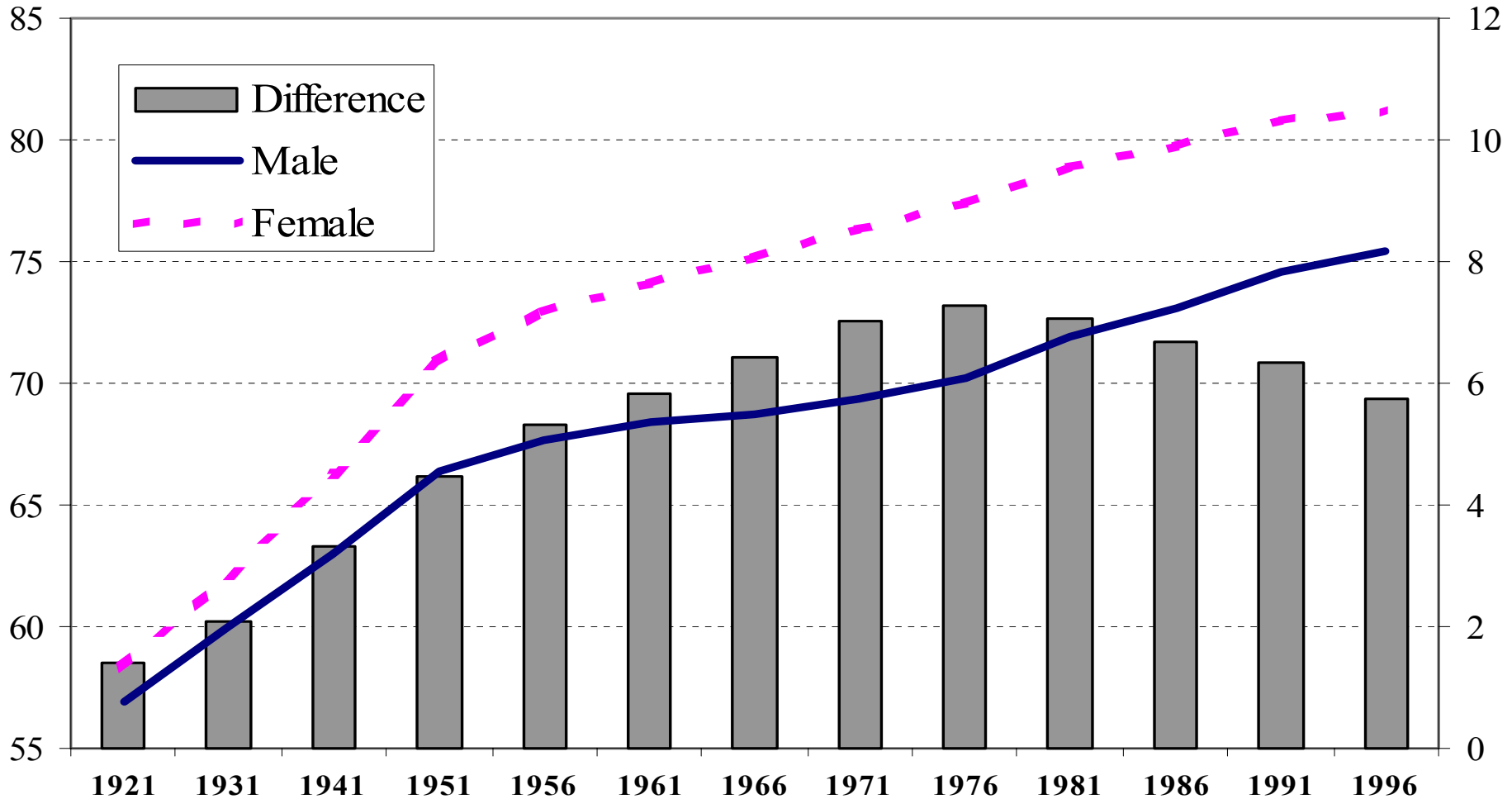


- Canadian Mortality Trends
- Mortality Projections – Living to 100 years
- CPP Retirement Beneficiary Mortality
- CPP Survivor Beneficiary Mortality
- Future Challenges – World Comparison

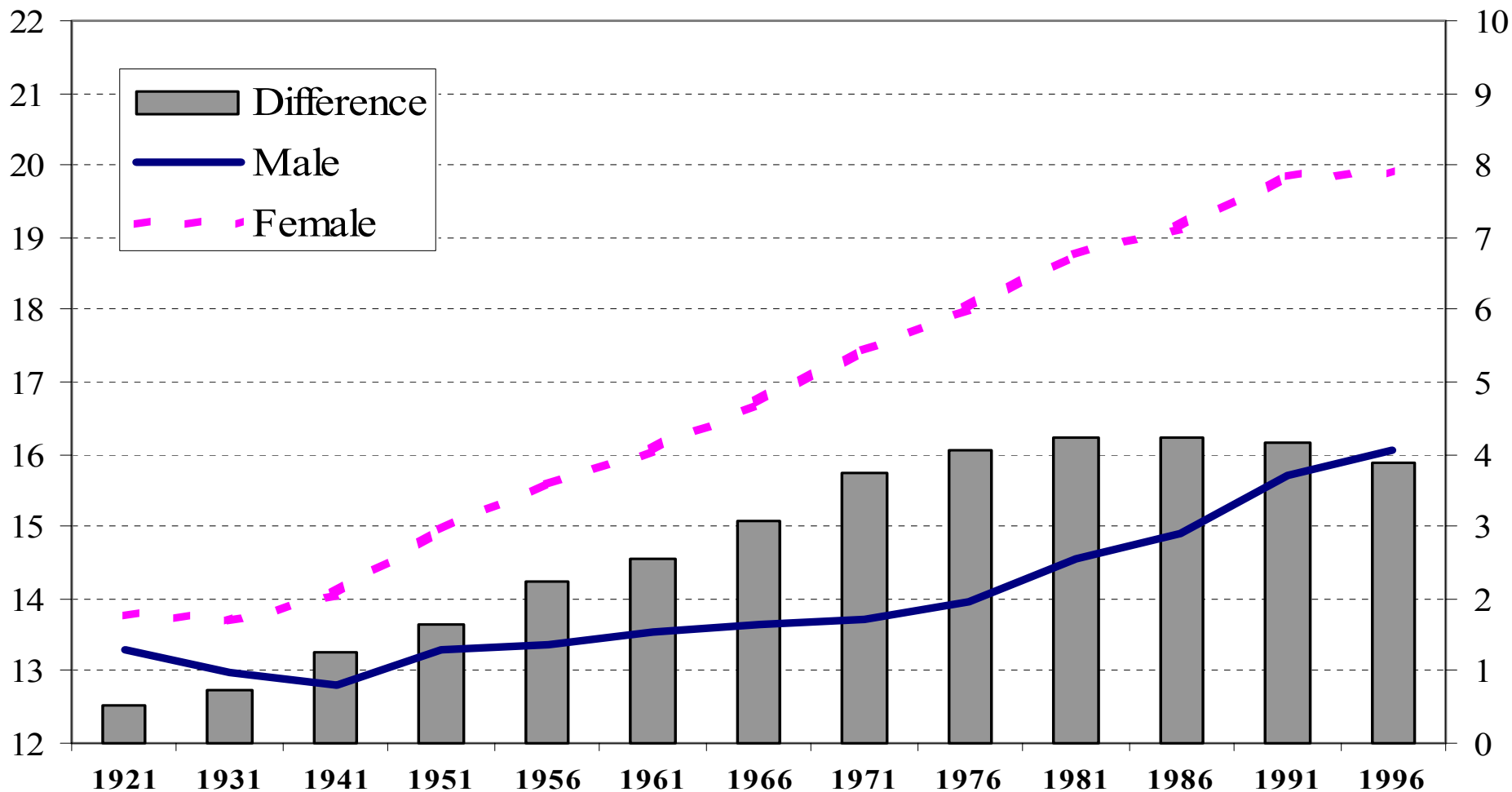




# Life Expectancy at Birth (LTC)



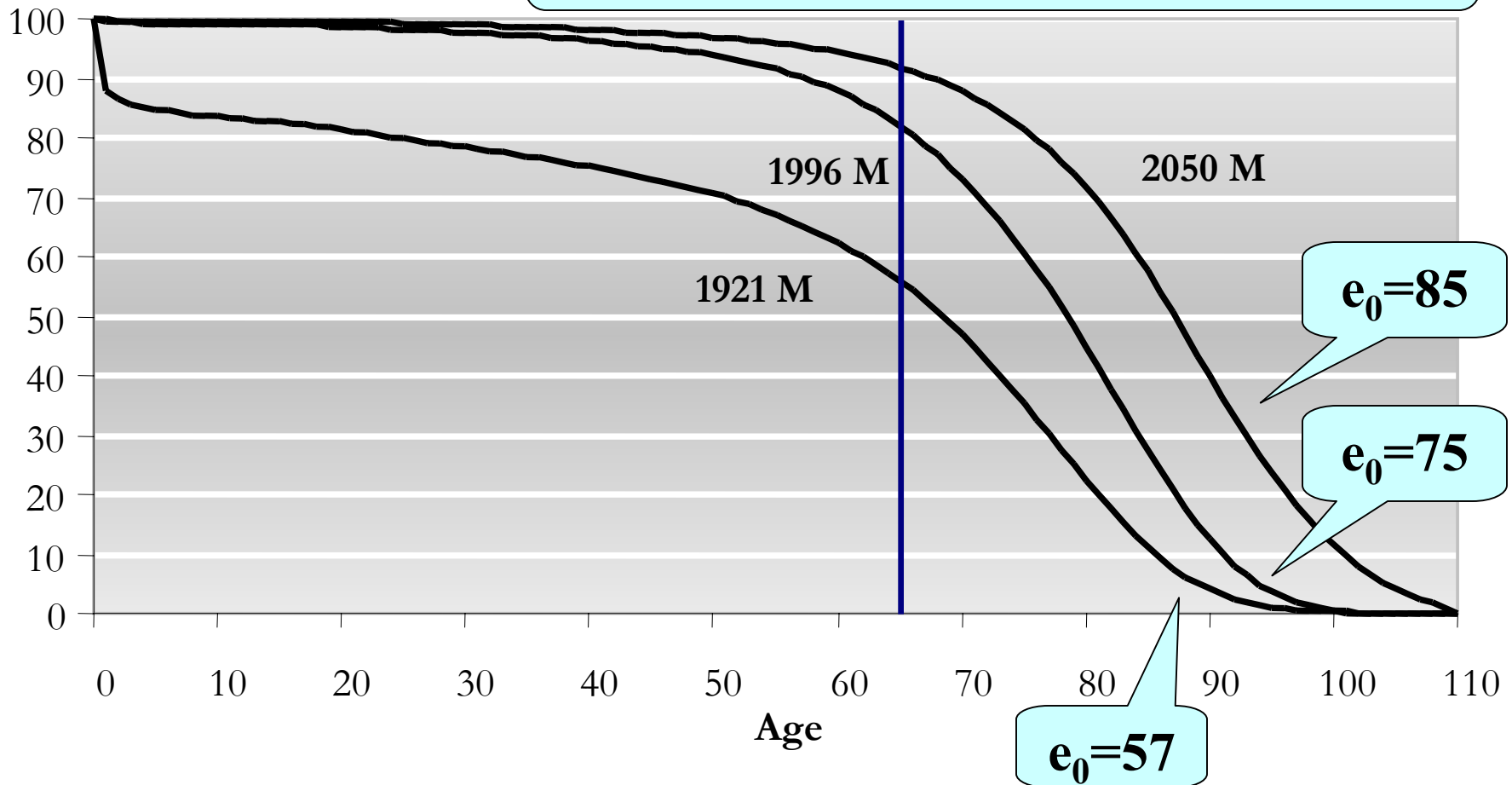
# Life Expectancy at Age 65 (LTC)





# Probability of surviving

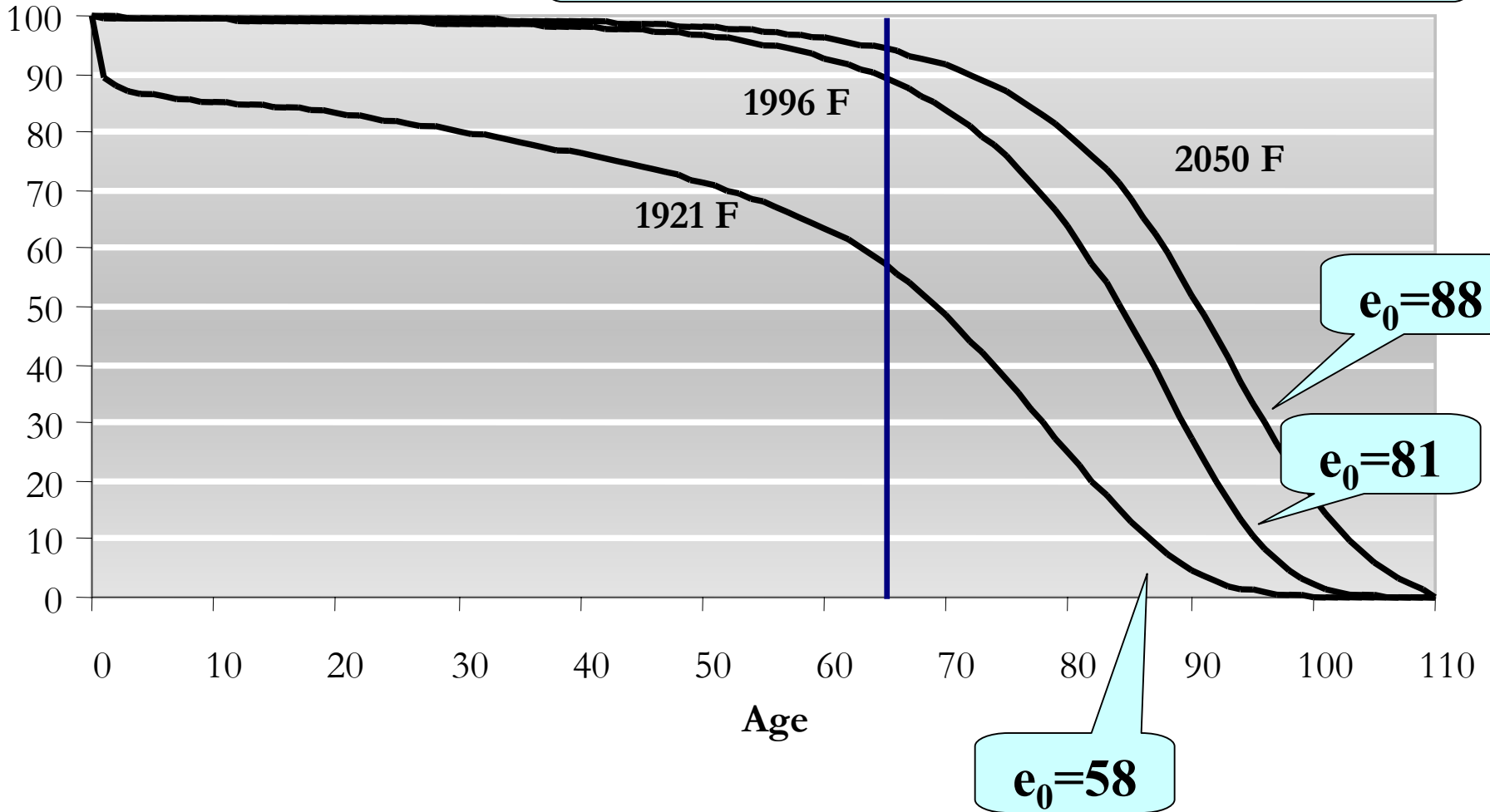
« 70% of males would die between 74 and 94 »  
*Globe and Mail, March 2002*





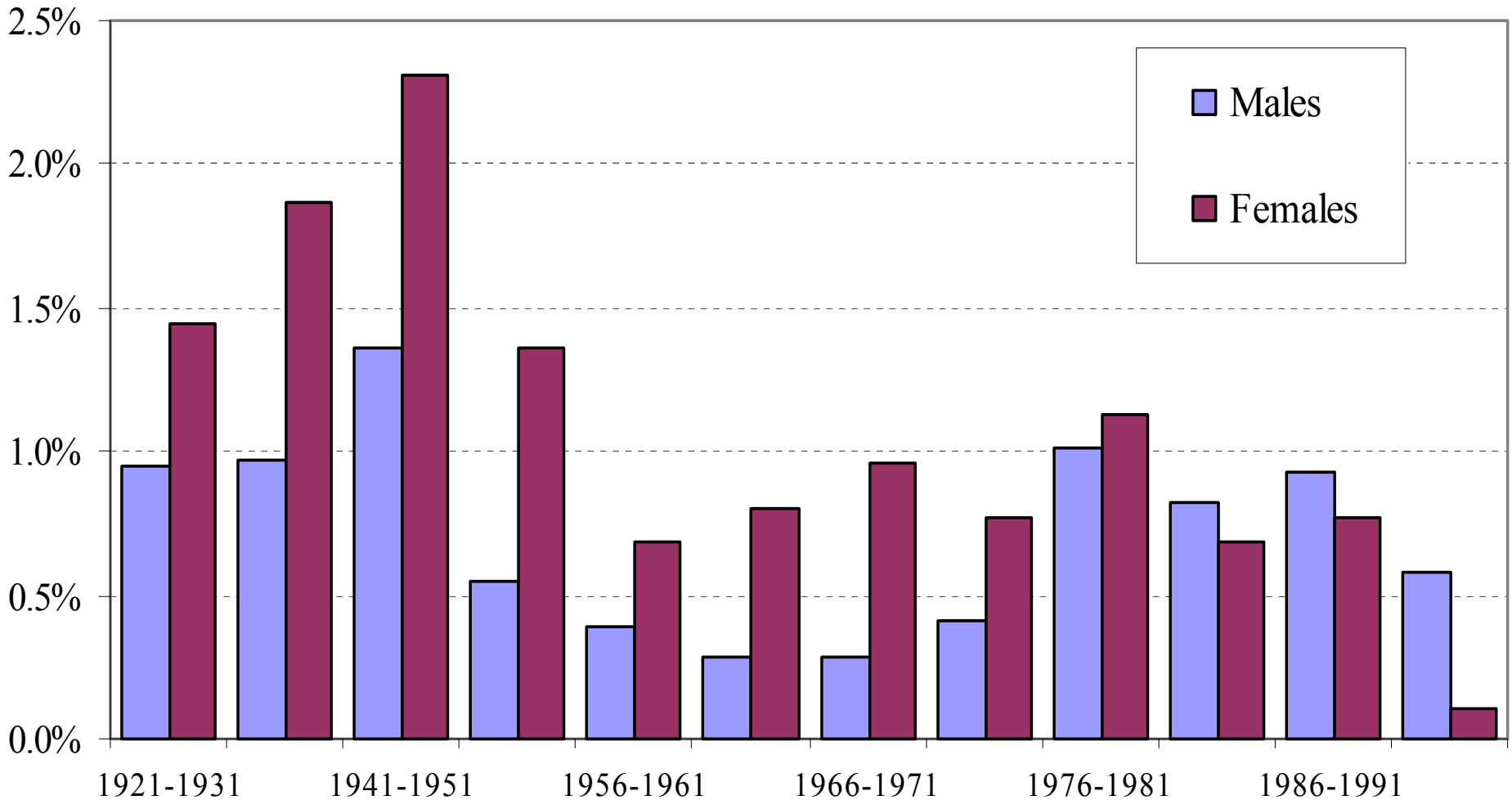
# Probability of surviving

« 70% of females would die between 77 and 96 »  
*Globe and Mail, March 2002*

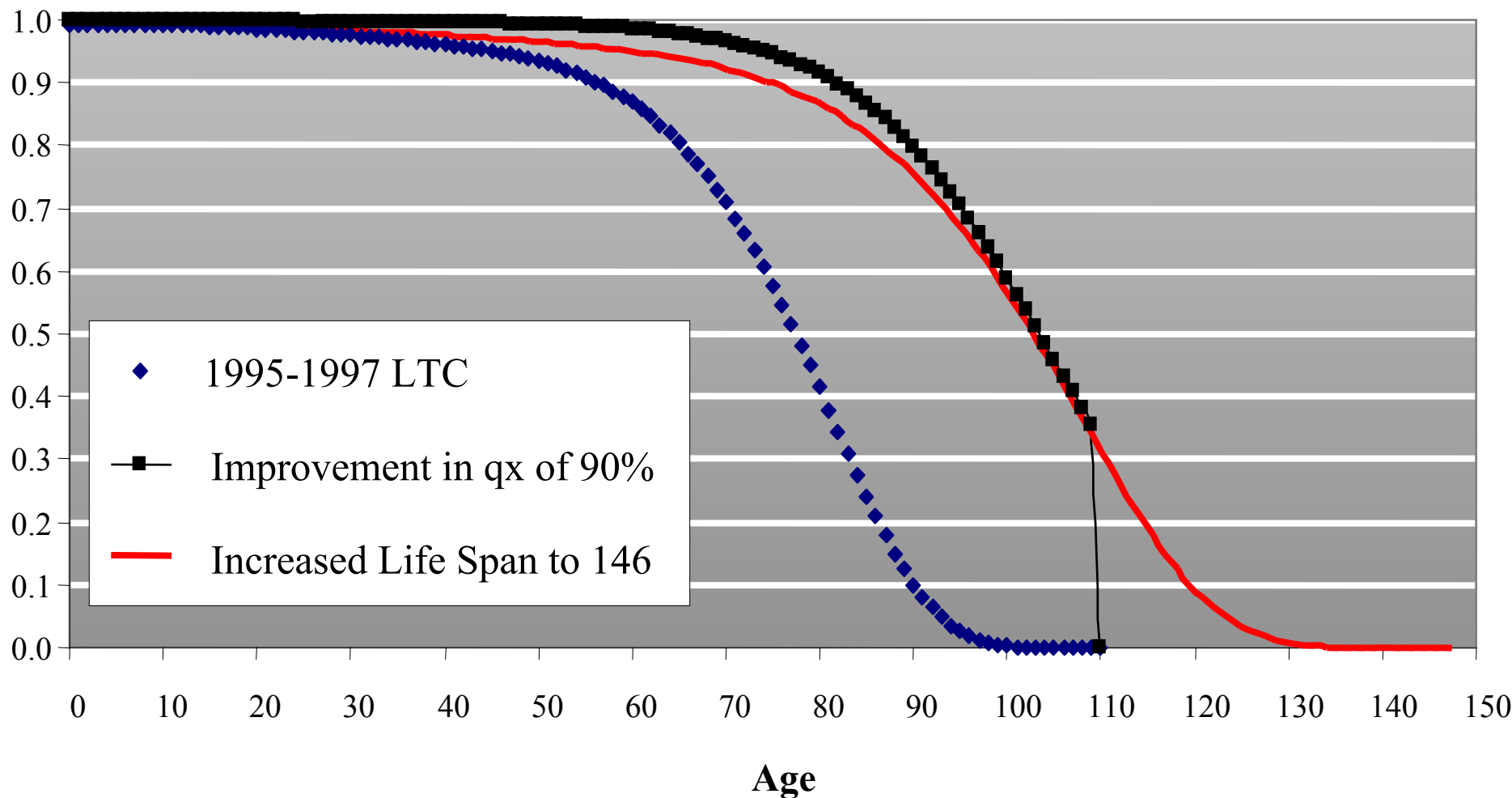




# Average Annual Population-Weighted Mortality Improvement Rates

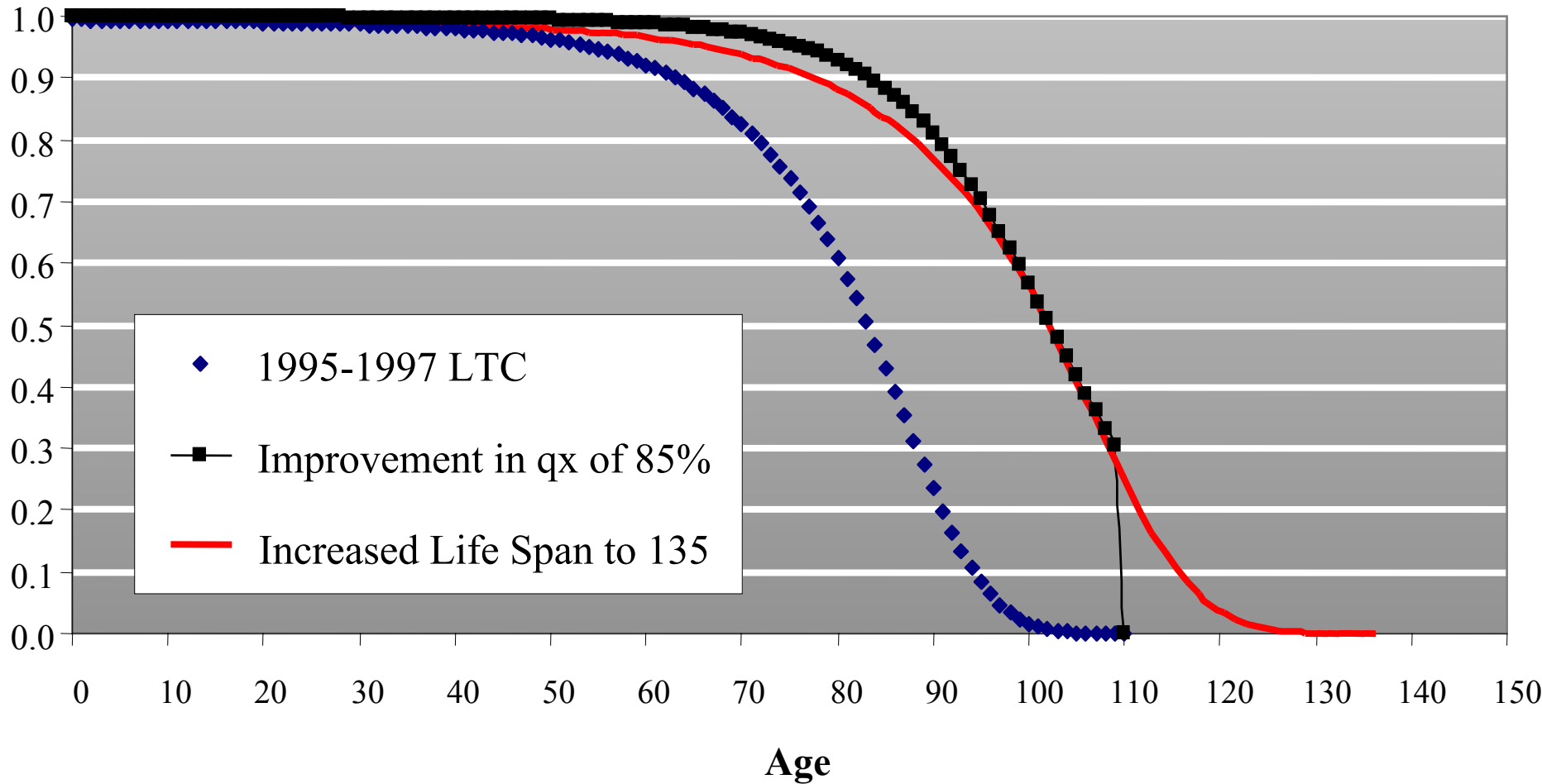


# Comparison of Survival Curves for Males



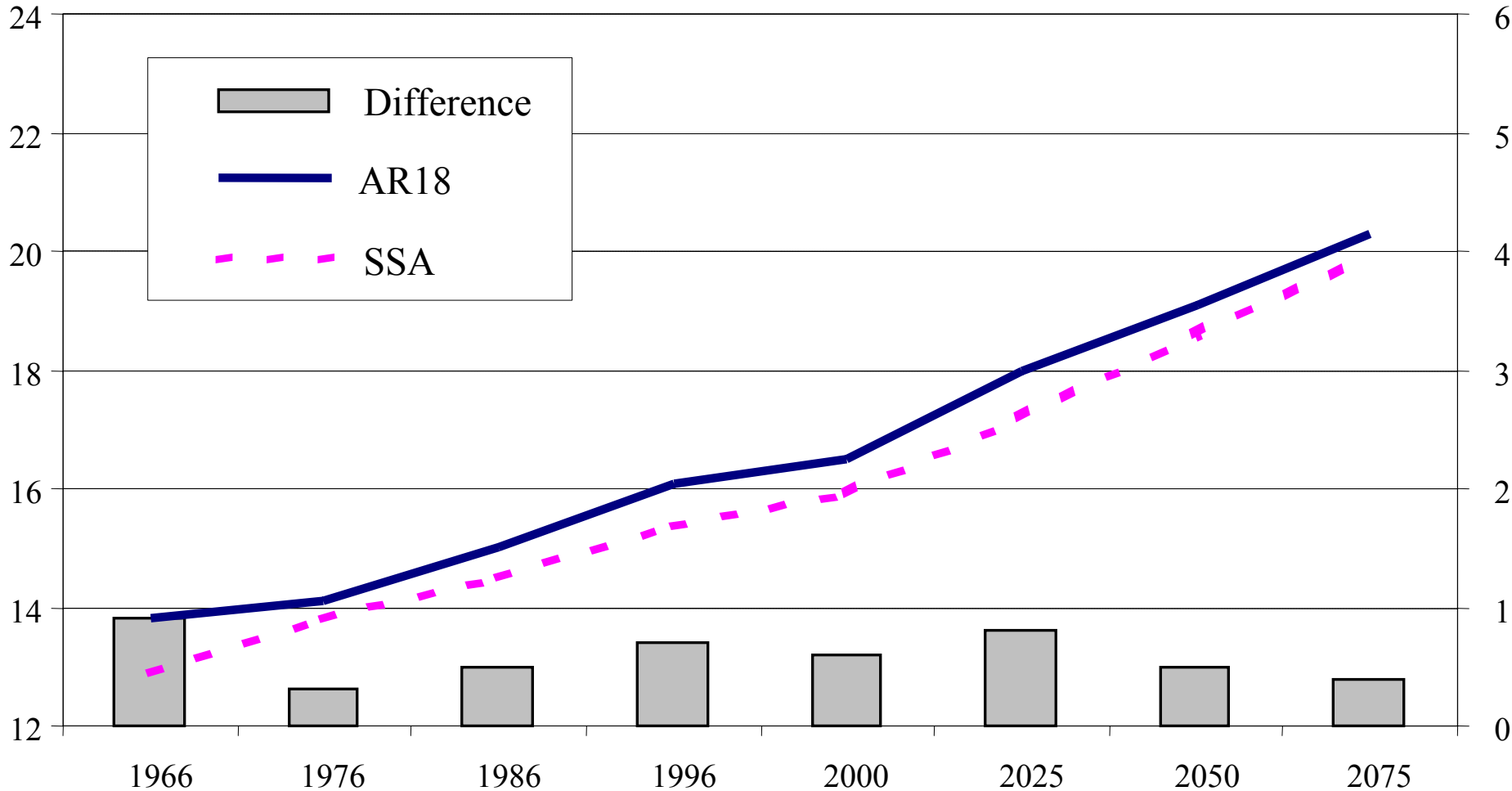


# Comparison of Survival Curves for Females

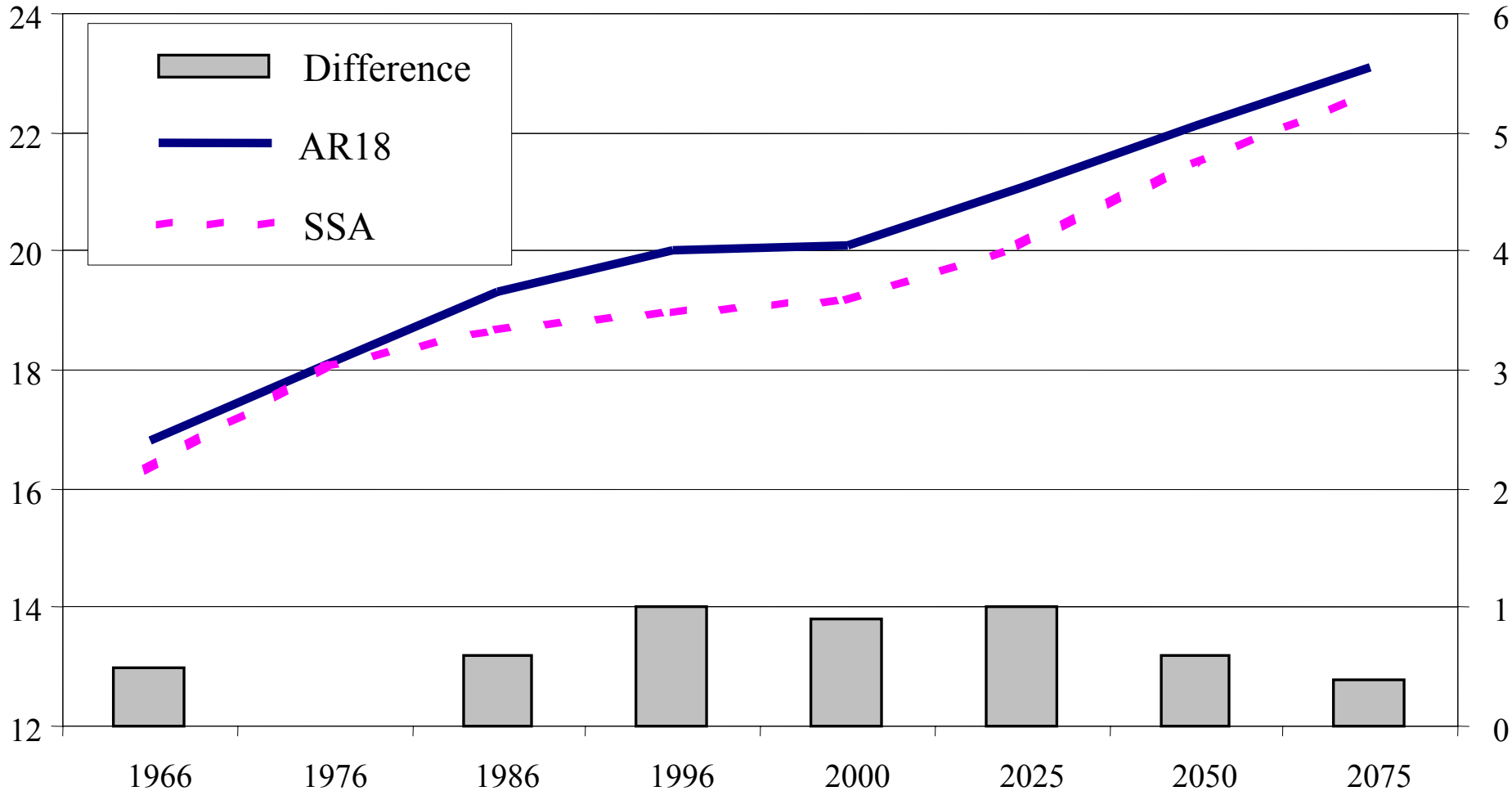




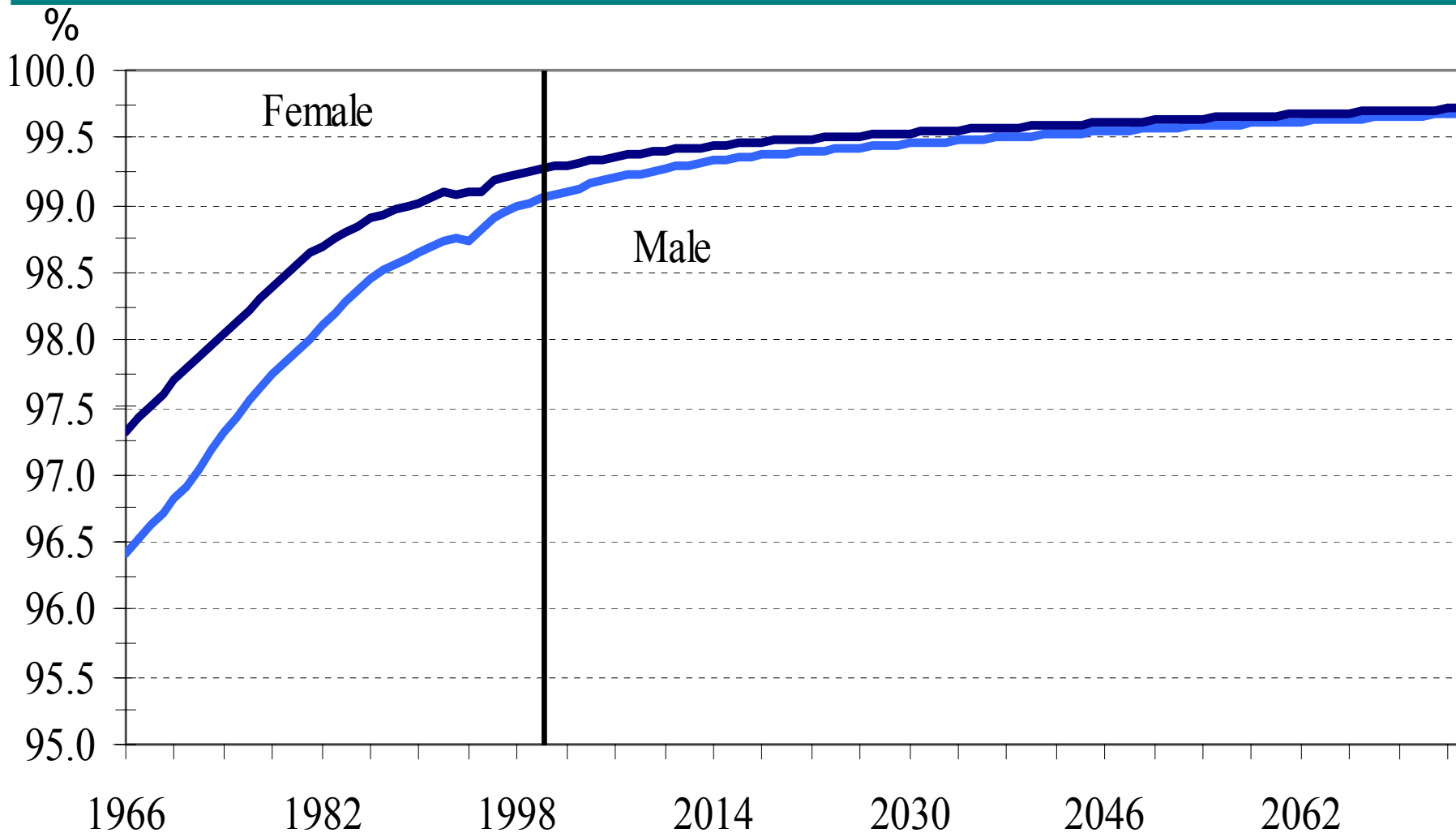
# Life Expectancy at Age 65 - Male



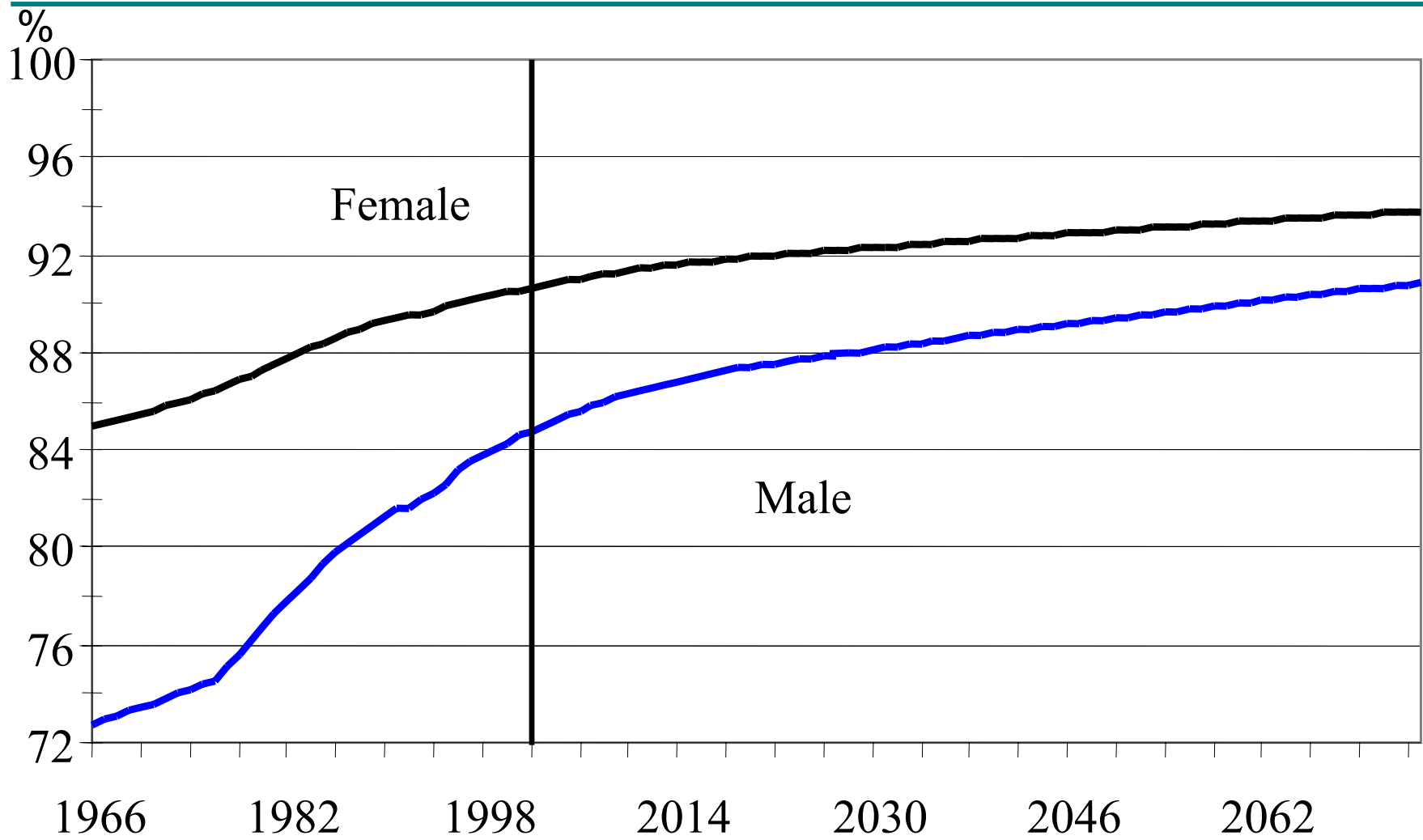
# Life Expectancy at Age 65 - Female



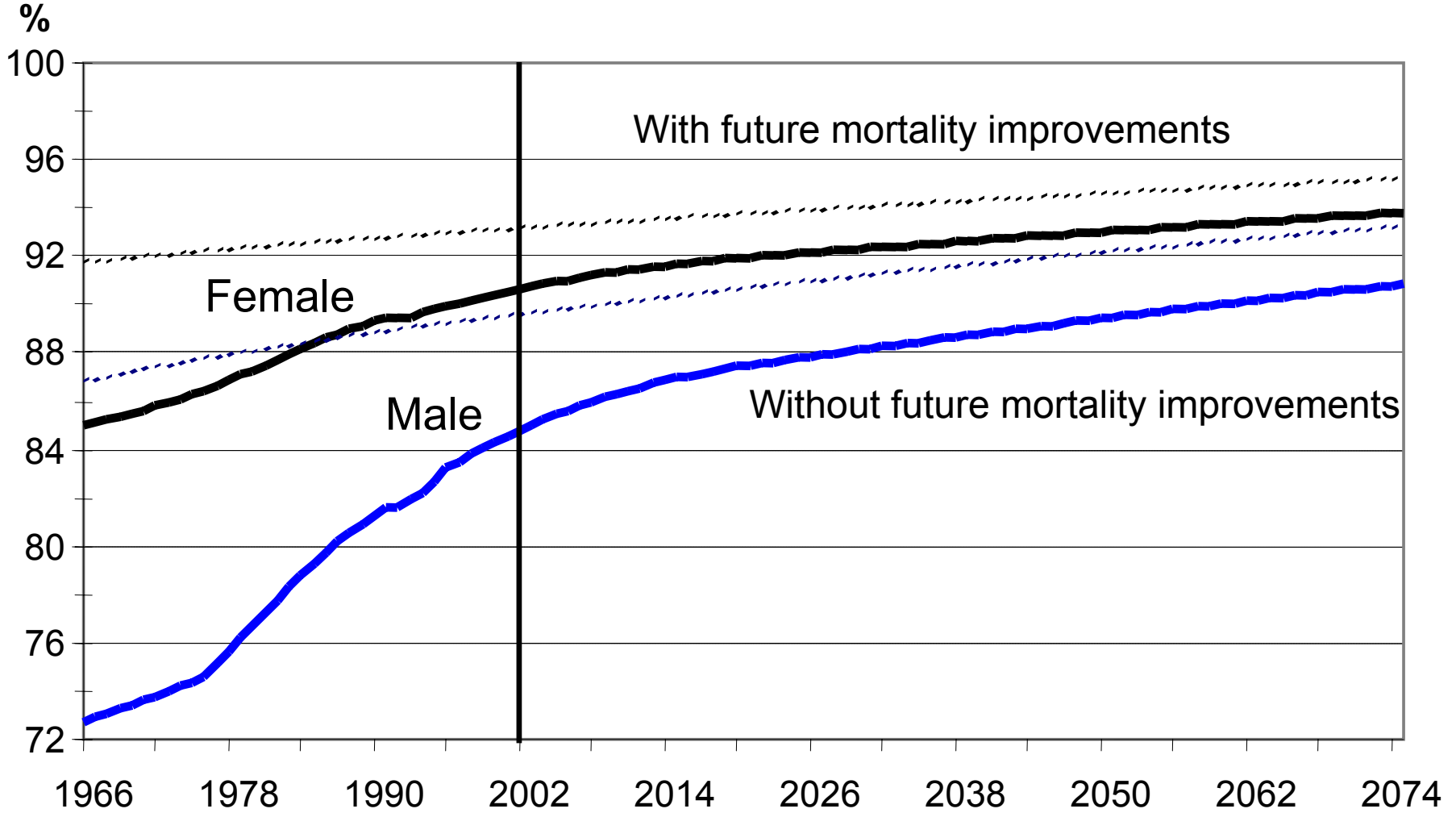
# Probability of Surviving from Birth to Age 18



# Probability of Surviving from Age 18 to Age 65

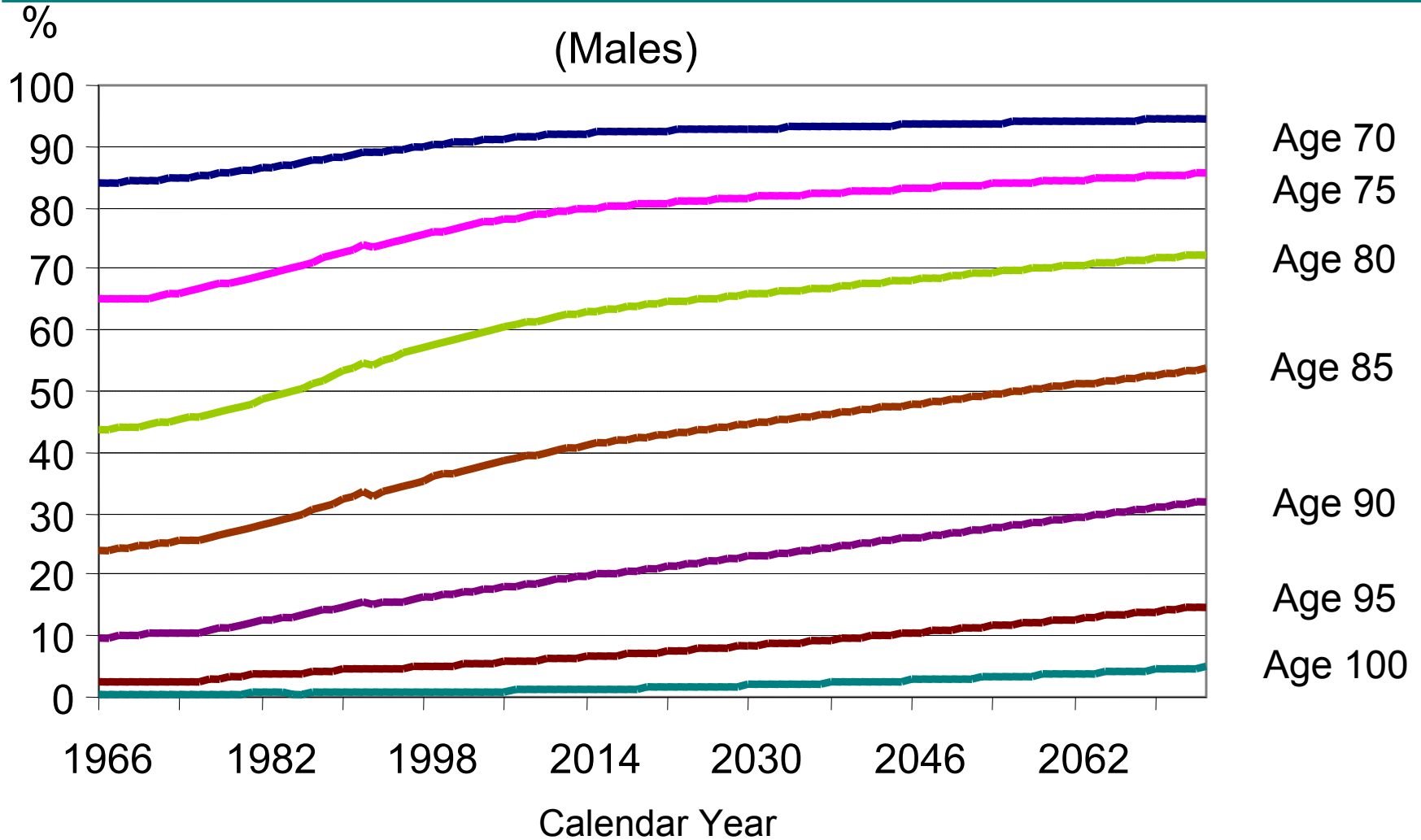


# Probability of Surviving from Age 18 to Age 65



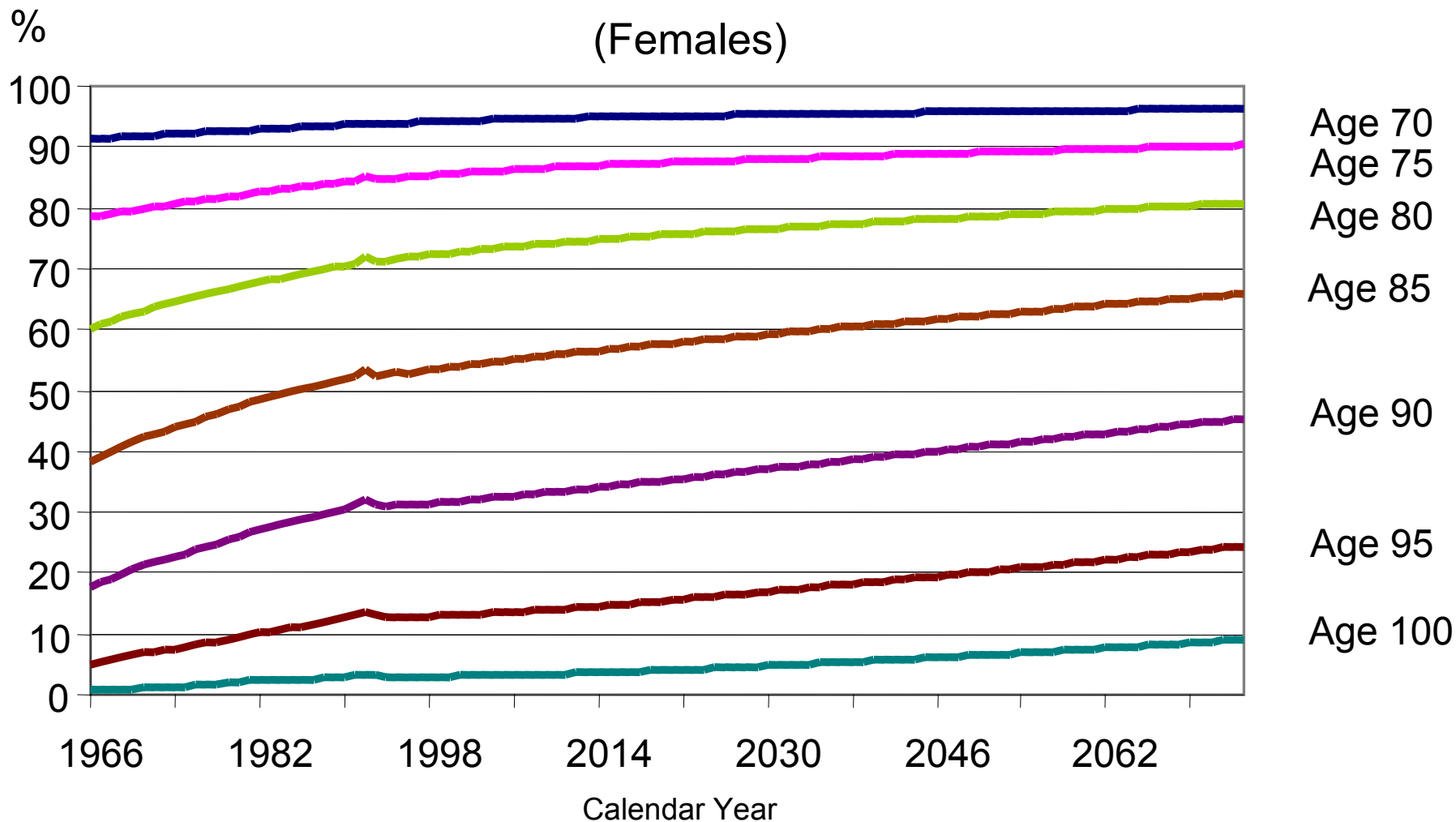


# Probability of Surviving from Age 65 To



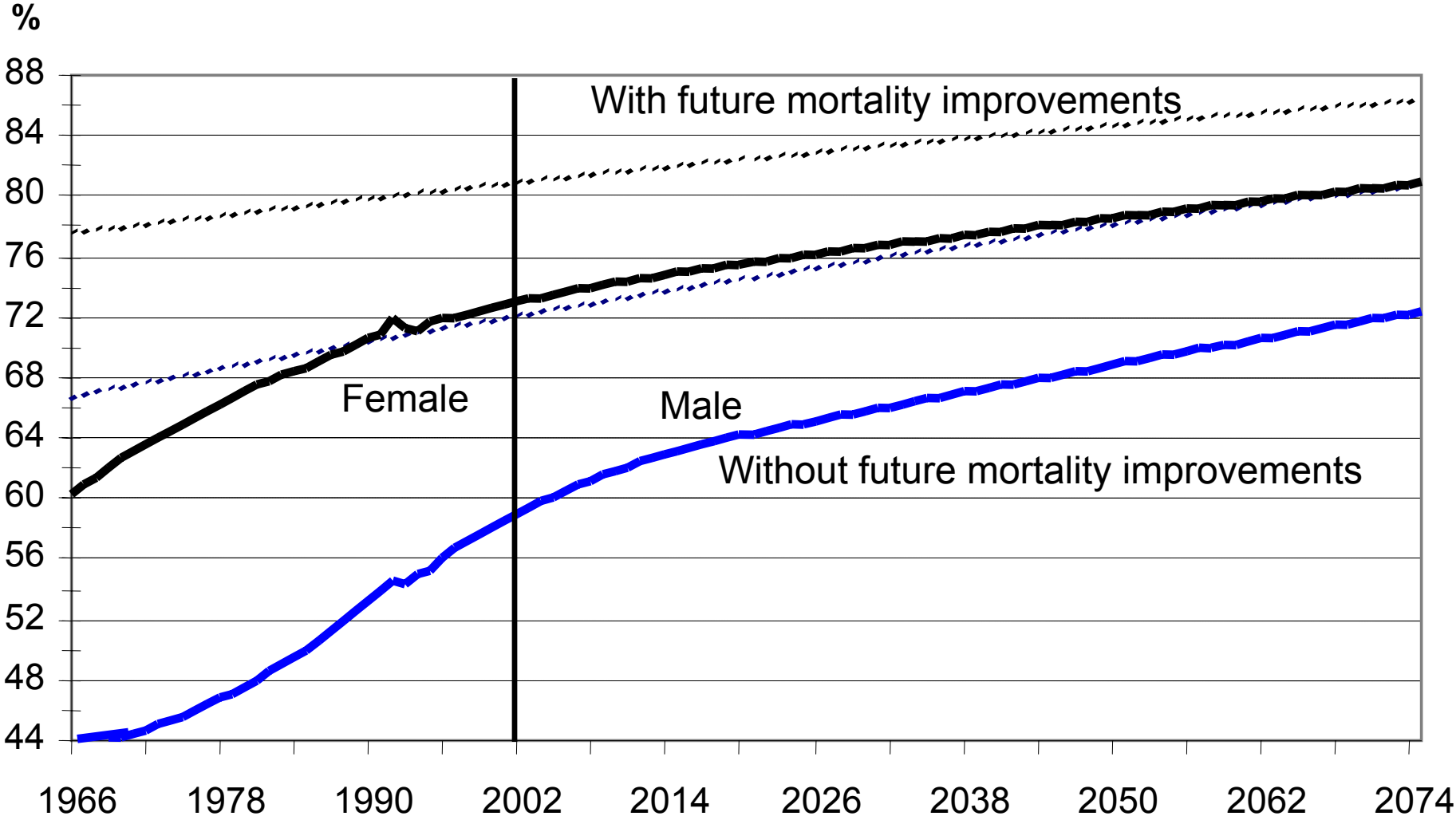


# Probability of Surviving from Age 65 To

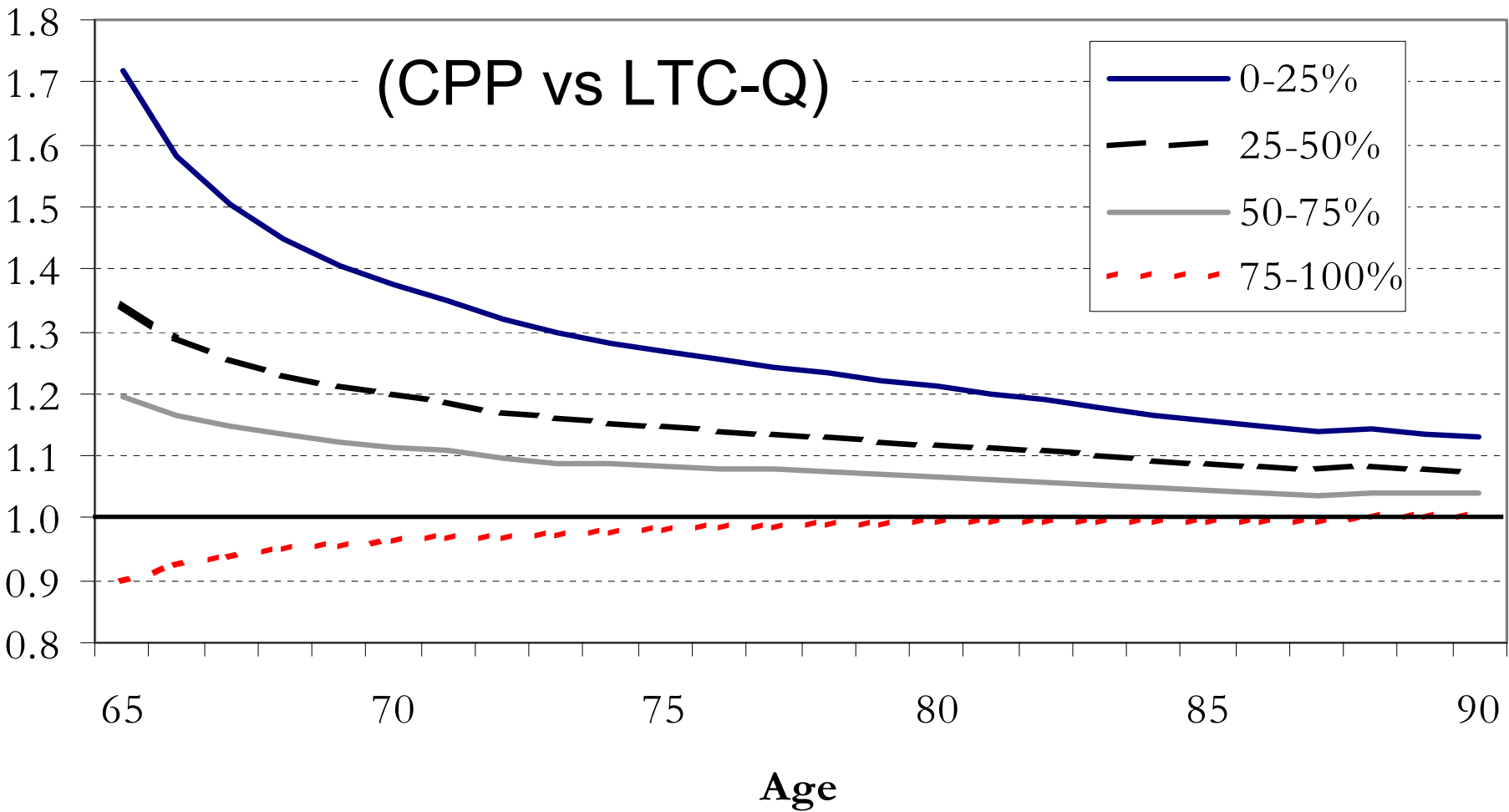




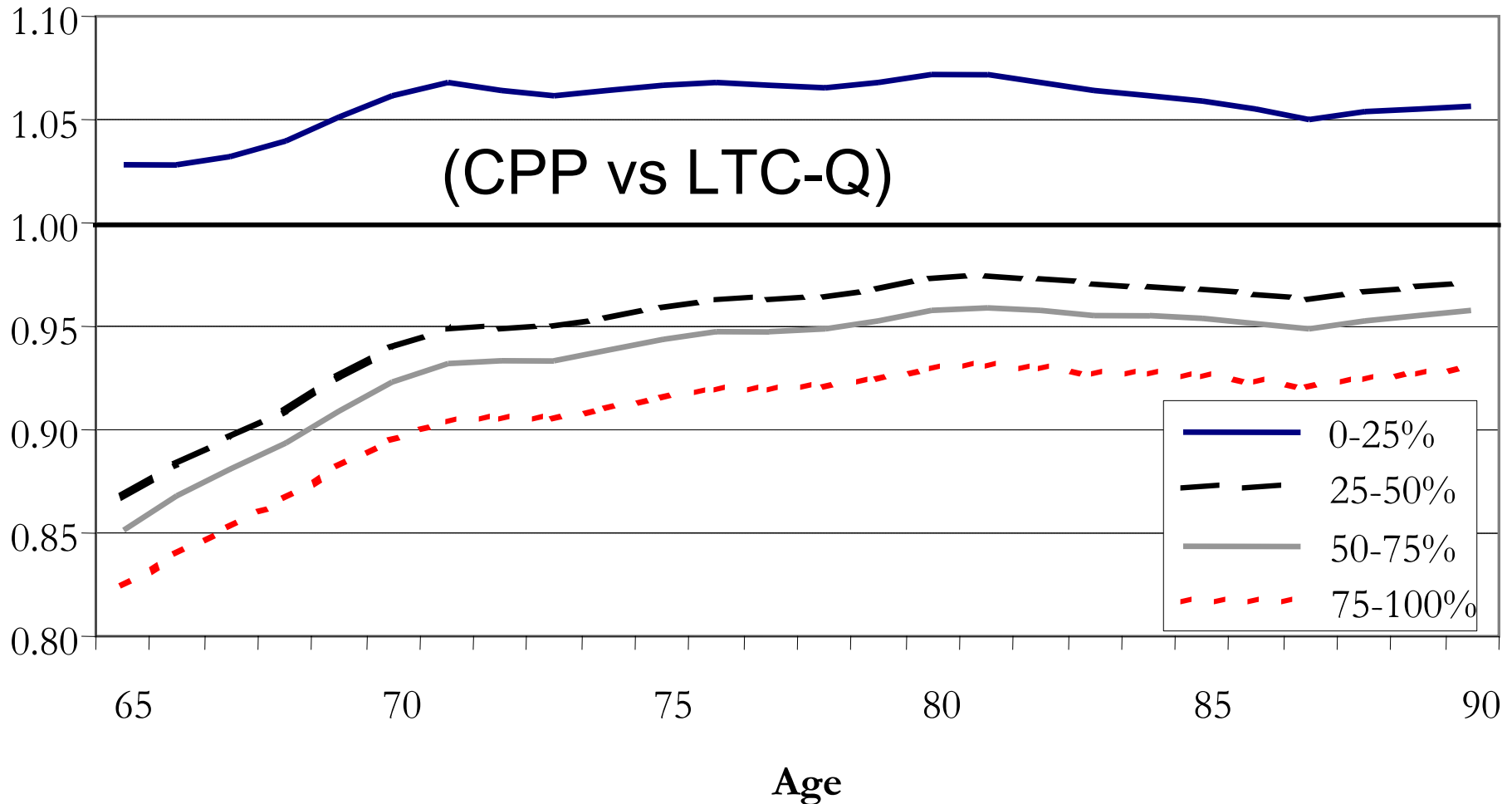
# Probability of Surviving from Age 65 to Age 80



# CPP Retirement Beneficiary Mortality Ratios (By Level of Pension – Males)



# CPP Retirement Beneficiary Mortality Ratios (By Level of Pension – Females)



# CPP Retirement Beneficiary Life Expectancies (By Level of Pension - Males)



Number of years

<b>Age</b>	<b>0-25%</b>	<b>25-50%</b>	<b>50-75%</b>	<b>75-100%</b>	<b>All</b>	<b>1995-97 C-QLT</b>
<b>60</b>	17.7	18.9	19.5	20.6	20.1	20.0
<b>65</b>	14.2	15.1	15.6	16.4	16.0	16.2
<b>70</b>	11.4	12.0	12.4	12.9	12.6	12.8
<b>75</b>	8.8	9.2	9.5	9.9	9.7	9.9
<b>80</b>	6.6	6.9	7.1	7.4	7.2	7.3
<b>85</b>	4.8	5.0	5.2	5.3	5.2	5.3
<b>90</b>	3.4	3.6	3.7	3.8	3.7	3.8

# CPP Retirement Beneficiary Life Expectancies (By Level of Pension - Females)



## Number of years

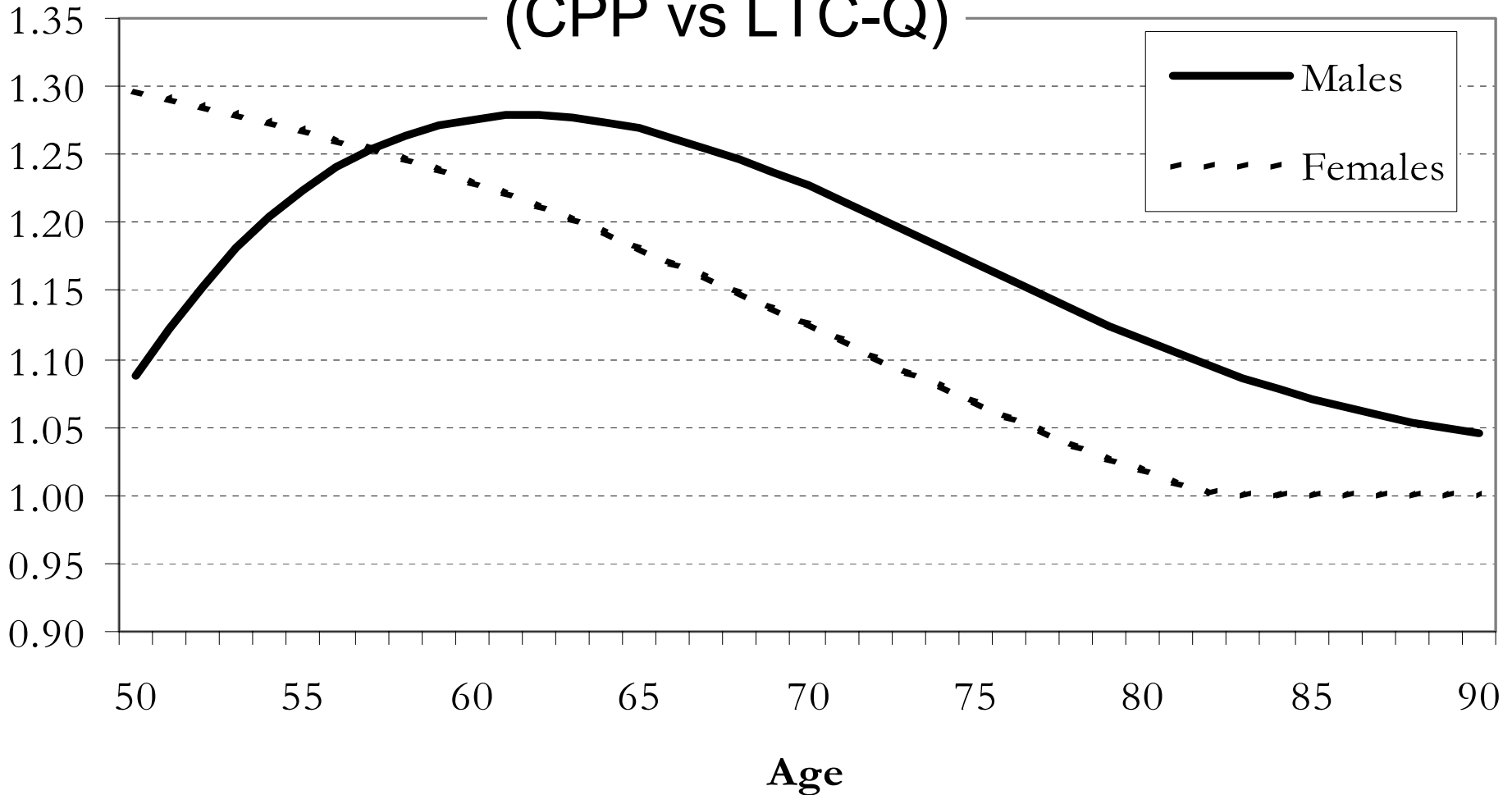
<b>Age</b>	<b>0-25%</b>	<b>25-50%</b>	<b>50-75%</b>	<b>75-100%</b>	<b>All</b>	<b>1995-97 C-QLT</b>
<b>60</b>	23.7	24.7	24.8	25.2	24.5	24.1
<b>65</b>	19.5	20.3	20.5	20.7	20.2	20.0
<b>70</b>	15.7	16.3	16.5	16.7	16.2	16.1
<b>75</b>	12.1	12.7	12.8	13.0	12.6	12.5
<b>80</b>	9.0	9.5	9.6	9.7	9.4	9.3
<b>85</b>	6.5	6.8	6.9	7.1	6.8	6.7
<b>90</b>	4.5	4.8	4.8	4.9	4.7	4.7



# CPP Survivor Beneficiary Mortality Ratios



(CPP vs LTC-Q)



# CPP Survivor Life Expectancies



Age	Males		Females	
	General Population	CPP	General Population	CPP
50	28.5	26.9	33.0	32.2
55	24.2	22.7	28.5	27.8
60	20.0	18.7	24.1	23.6
65	16.2	15.1	20.0	19.6
70	12.8	12.0	16.1	15.9
75	9.9	9.3	12.5	12.4
80	7.3	7.0	9.3	9.3
85	5.3	5.1	6.7	6.7
90	3.8	3.7	4.7	4.7



# Evolution of OAS Beneficiaries (in thousands)



Age Group	2000		2050	
	#	%	#	%
<b>65-69</b>	1,098	29 %	2,300	24 %
<b>70-79</b>	1,783	47 %	3,919	41 %
<b>80+</b>	896	24 %	3,364	35 %
<b>All</b>	3,777	100 %	9,584	100 %

Expected total population in 2050: 41 million



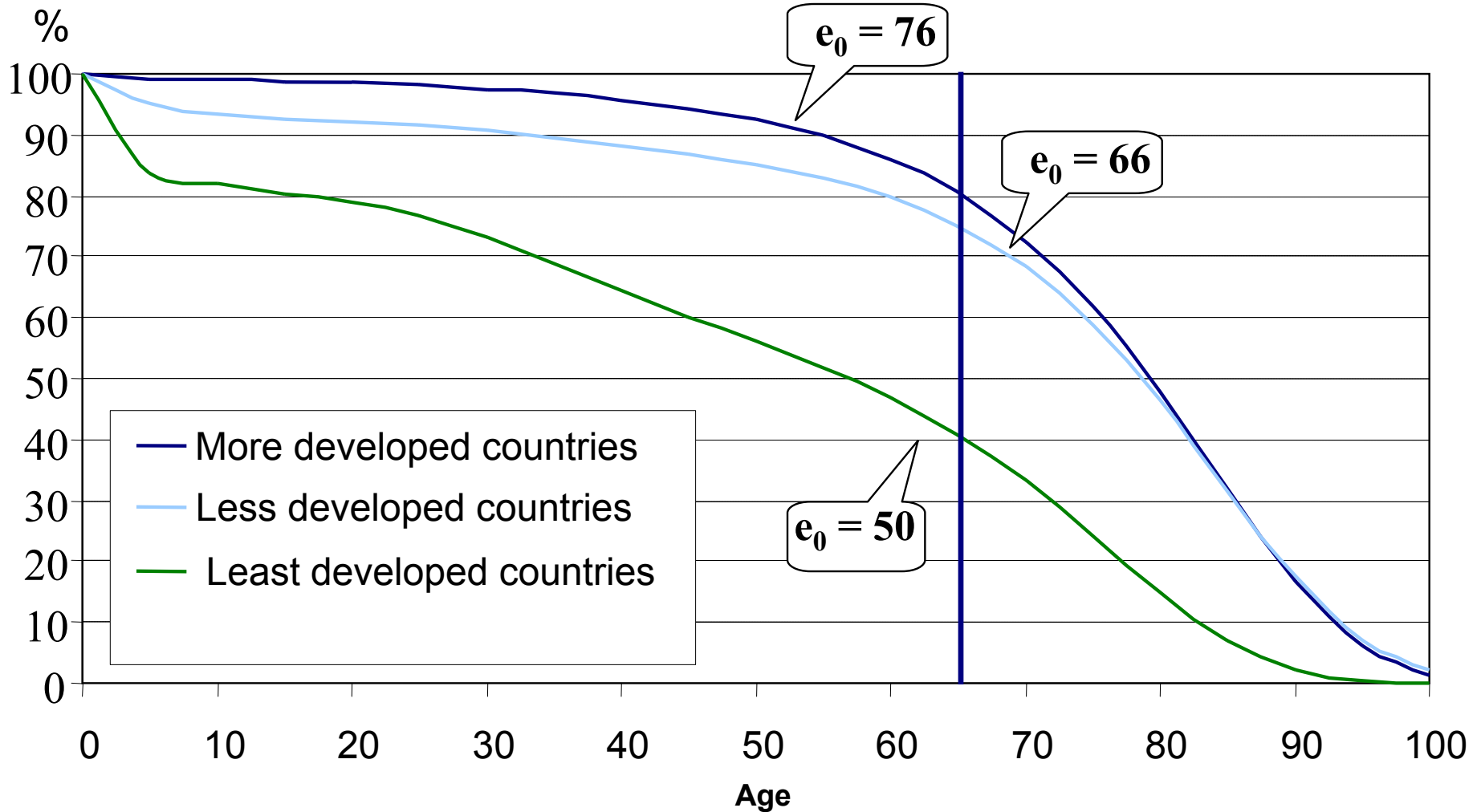
# Future challenges



- Life expectancy at birth of 100 is practically impossible in the next half century unless there are dramatic medical and scientific breakthroughs.
- Future mortality improvements are expected to come more slowly and at older ages, as mortality rates at younger ages are already very low.
- In the context of CPP, more and more contributors are expected to reach the retirement age of 65.
- CPP retirement beneficiaries are expected to receive their benefit for a longer period.



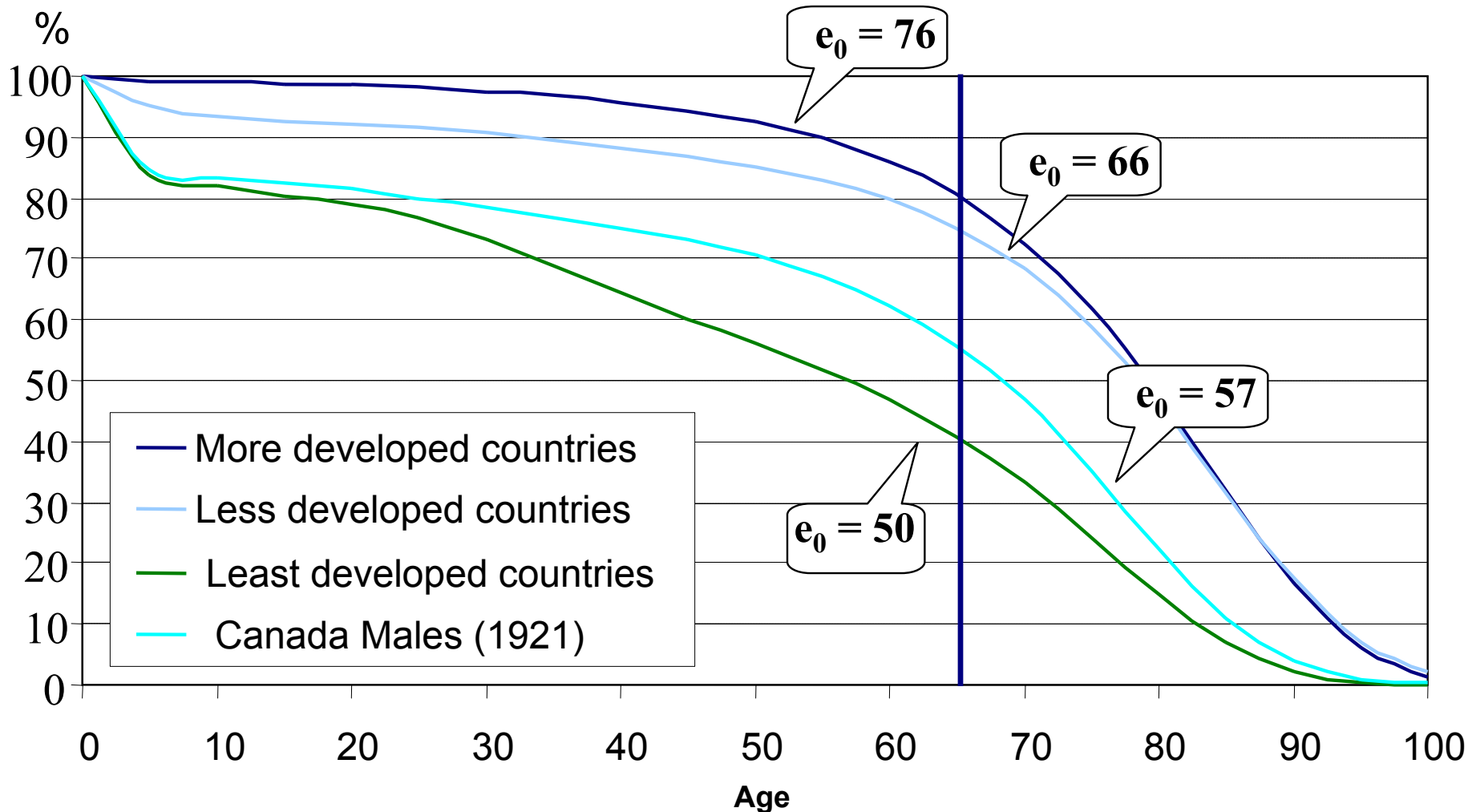
# Probability of Surviving (World comparison)



United Nations Population Division, Period 2000-2005



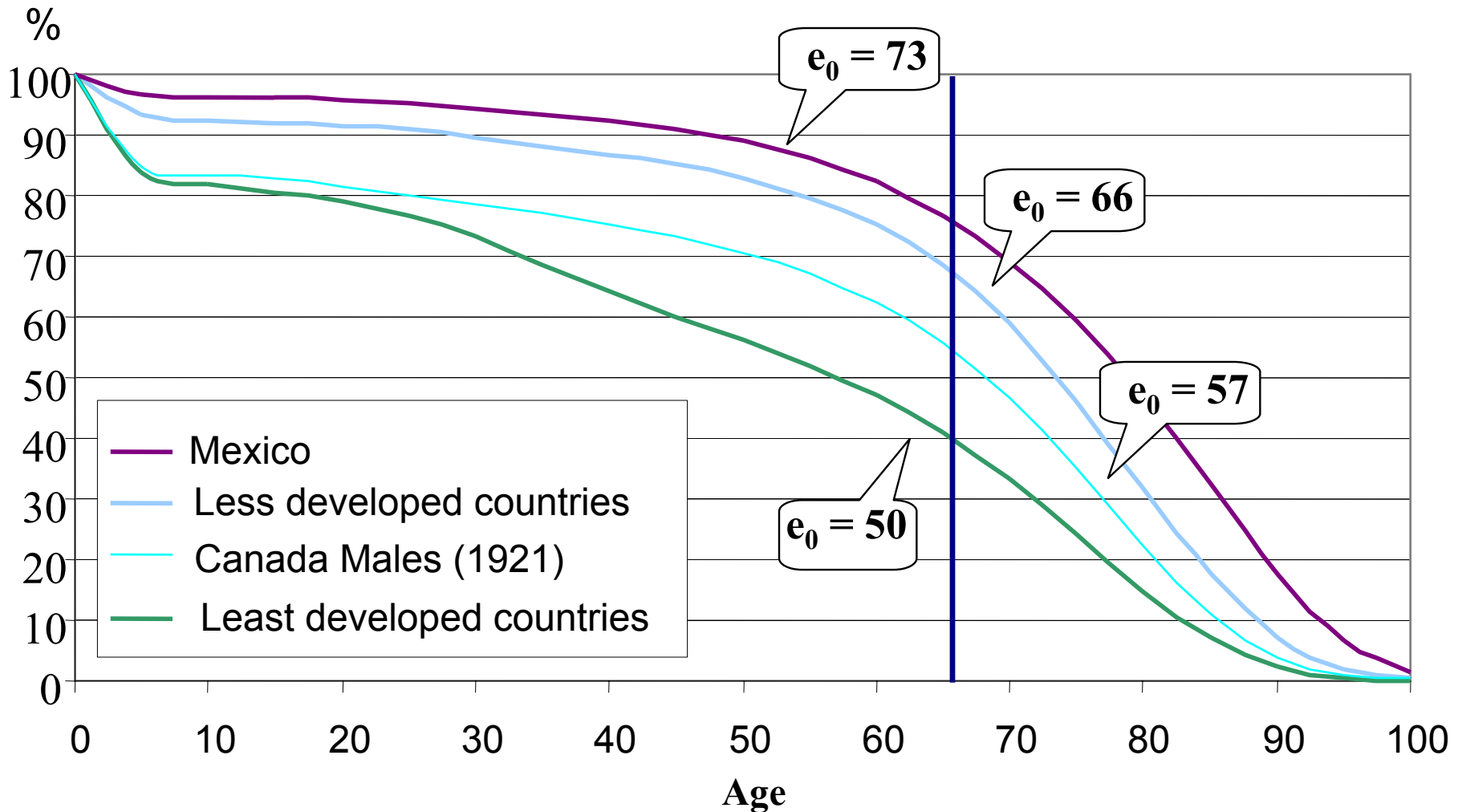
# Probability of Surviving (World comparison)



United Nations Population Division, Period 2000-2005



# Probability of Surviving (World comparison)



United Nations Population Division, Period 2000-2005



# Life Expectancy at Birth



Countries	(In 1980)	(In 2000)	(In 2050)
Japan	- 5	<b>82</b> (9 <sup>th</sup> )	+ 6
United States	- 4	<b>77</b> (3 <sup>rd</sup> )	+ 5
Mexico	- 5	<b>73</b> (11 <sup>th</sup> )	+ 7
China	- 4	<b>71</b> (1 <sup>st</sup> )	+ 6
Brazil	- 5	<b>68</b> (5 <sup>th</sup> )	+ 10
Russia	+ 1	<b>67</b> (6 <sup>th</sup> )	+ 7
India	- 9	<b>64</b> (2 <sup>nd</sup> )	+ 10
Nigeria	- 4	<b>51</b> (10 <sup>th</sup> )	+ 13
Zambia	+ 20	<b>32</b> (74 <sup>th</sup> )	+ 20

*Since 1980, the difference in  $e_0$  between the best and the worst country has actually increased from around 40 to 50 years !*

