



Office of the Superintendent of
Financial Institutions Canada

Bureau du surintendant des
institutions financières Canada

Office of the Chief Actuary

Bureau de l'actuaire en chef

Mortality projections for Social Security Programs in Canada and its implications



*Presentation to the Living to 100 International Research Symposium,
Orlando, United States*



OSFI
BSIF

8 January 2008

Canada 

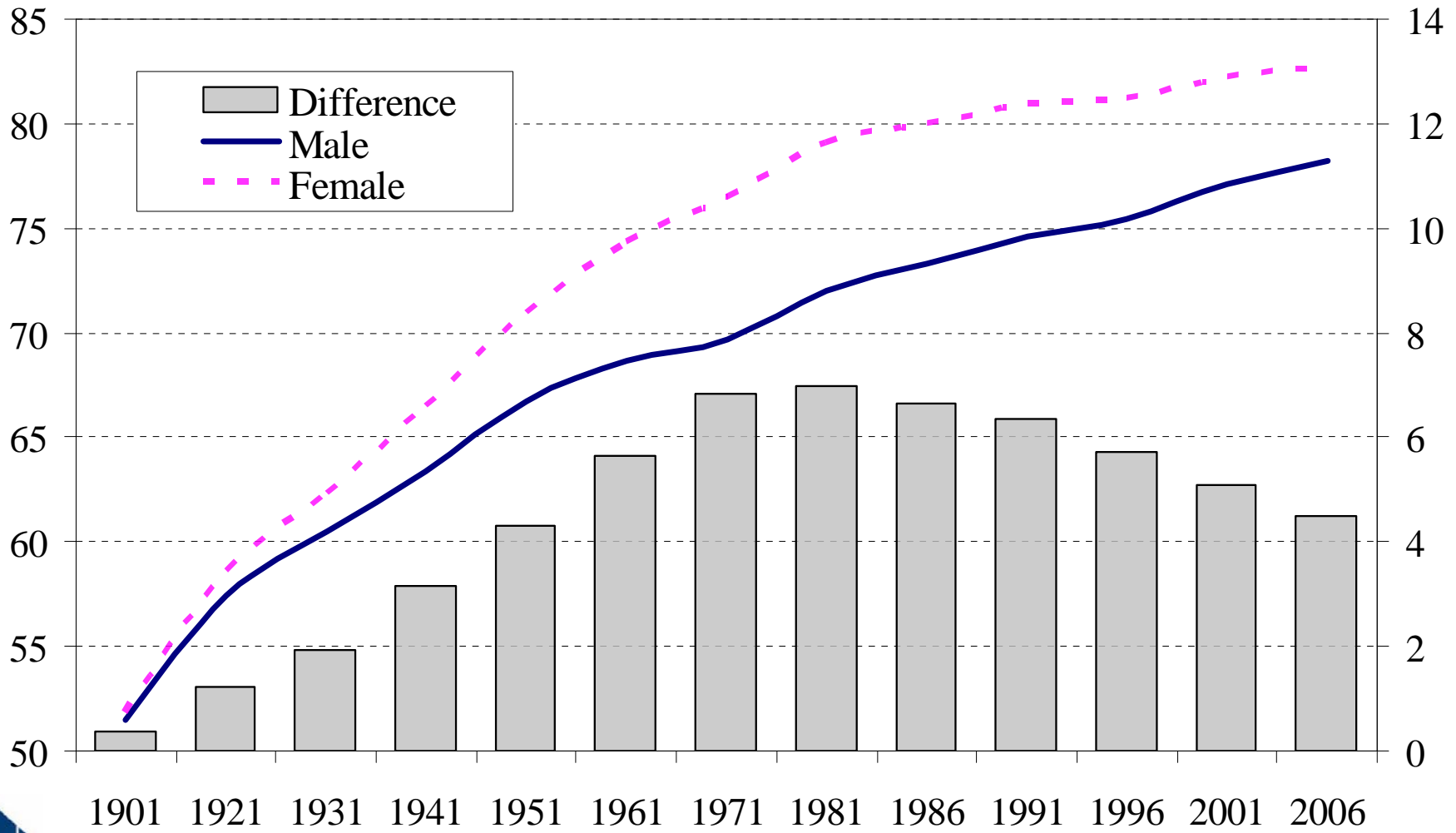
Presentation



- **General Population Mortality Trends in Canada**
- **Mortality Experience by Income and Marital Status**
- **Mortality Projections**
- **Uncertainty of Results and International Comparison**

Prince George, British Columbia

Life Expectancy at Birth

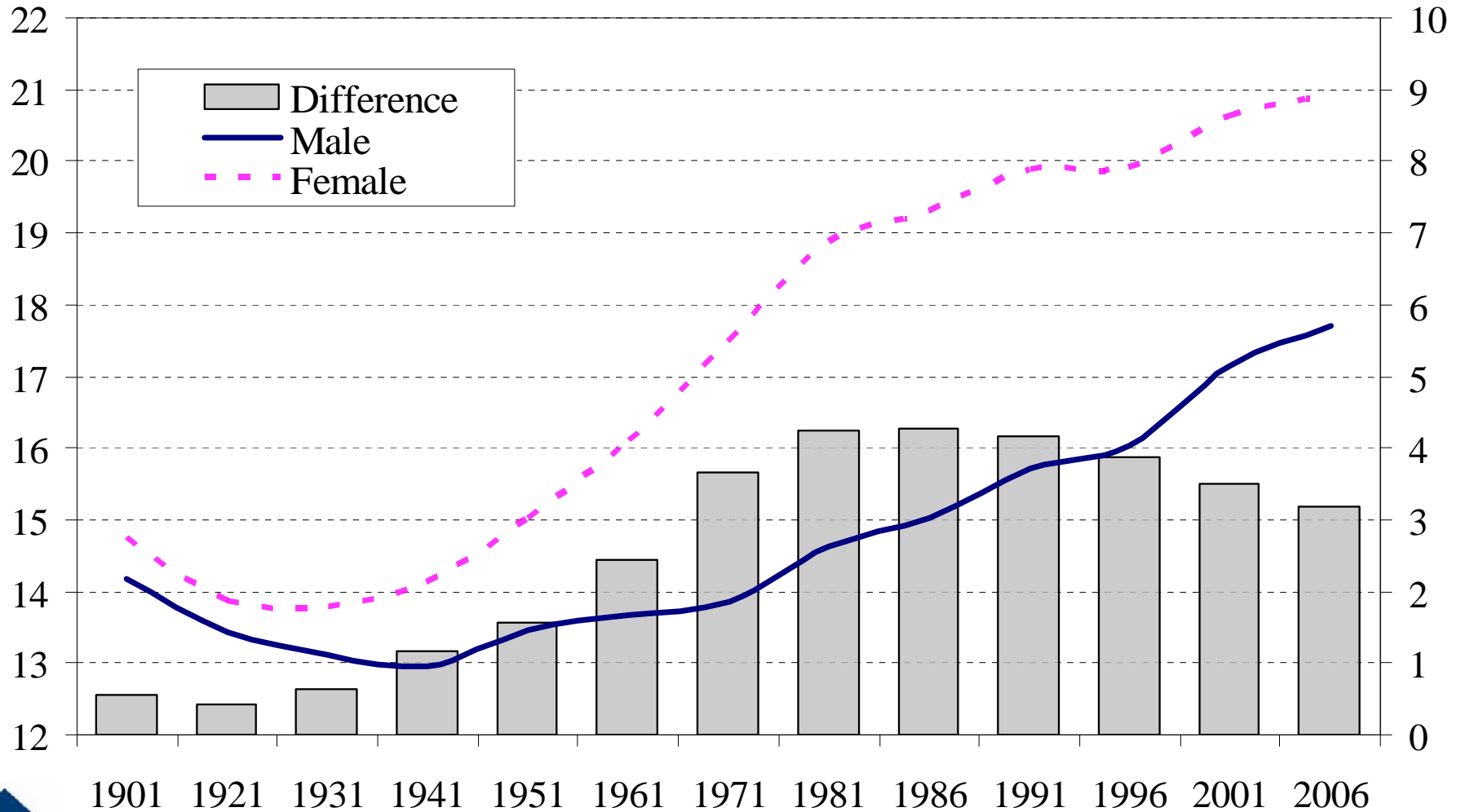


Source : Life Tables for Canada, Statistics Canada

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Life Expectancy at Age 65



Source : Life Tables for Canada, Statistics Canada

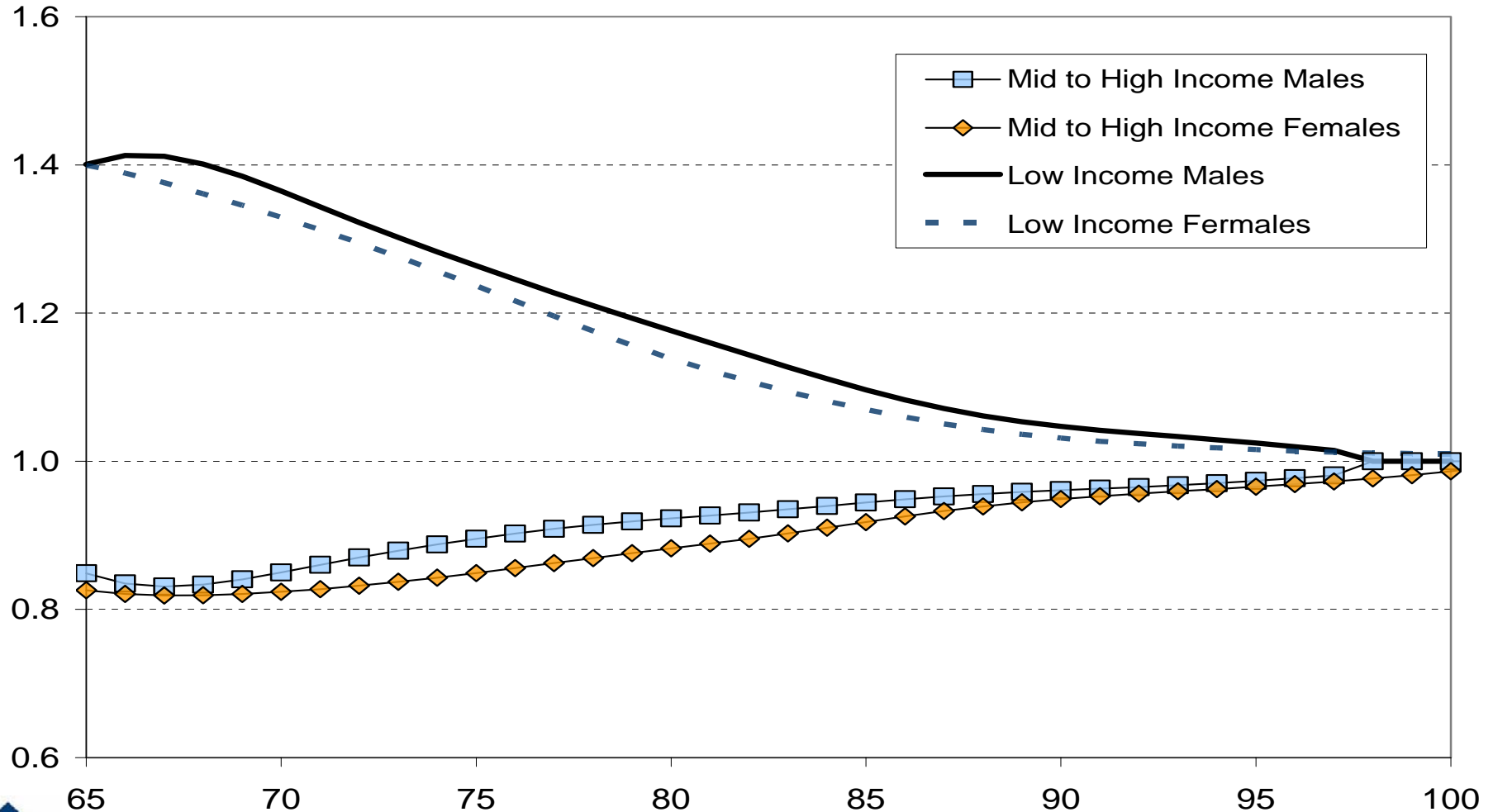
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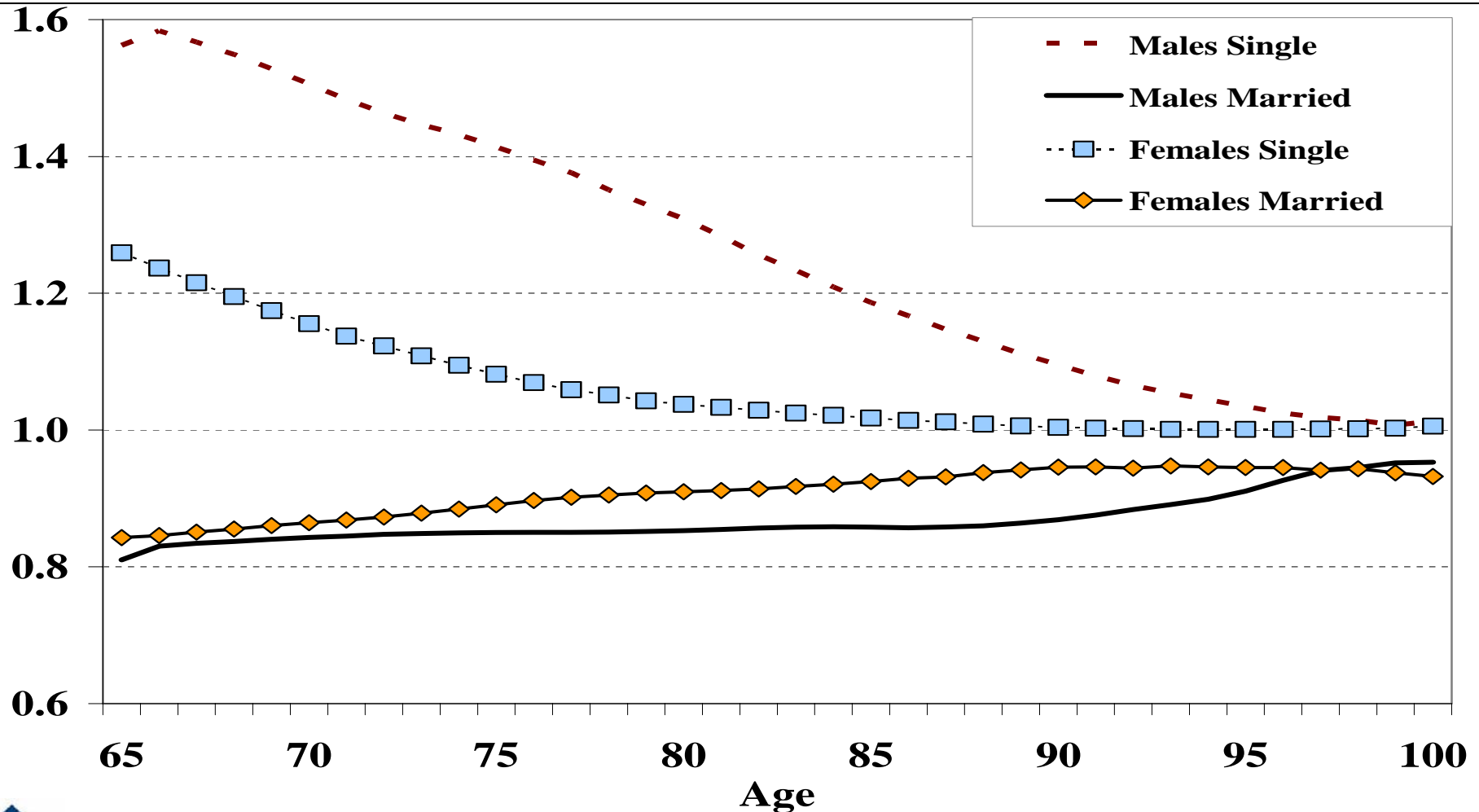
Rivière-du-Milieu, Québec

Mortality Ratios by income



Source : Old Age Security Administrative Database, Actuarial Study no 5

Mortality Ratios by Marital Status



Source : Old Age Security Administrative Database, Actuarial Study no 5

Life Expectancies at 65 by Status

Status	Males				Females			
	Total	Single	Married	Delta	Total	Single	Married	Delta
OAS	16.6	14.2	17.9	+3.7	20.2	19.7	21.0	+1.3
Low Income Seniors	15.0	13.0	16.3	+3.3	19.0	18.6	19.8	+1.2
High-Income Seniors	19.5	17.6	20.6	+3.0	22.4	22.1	23.3	+1.2
Differential Between High and Low Income Seniors	+4.5	+4.6	+4.3	-	+3.4	+3.5	+3.5	-
Born in Canada	16.2	-	-	-	19.9	-	-	-
Born Outside Canada	17.8	-	-	-	21.1	-	-	-

Source : Old Age Security Administrative Database, Actuarial Study no 5

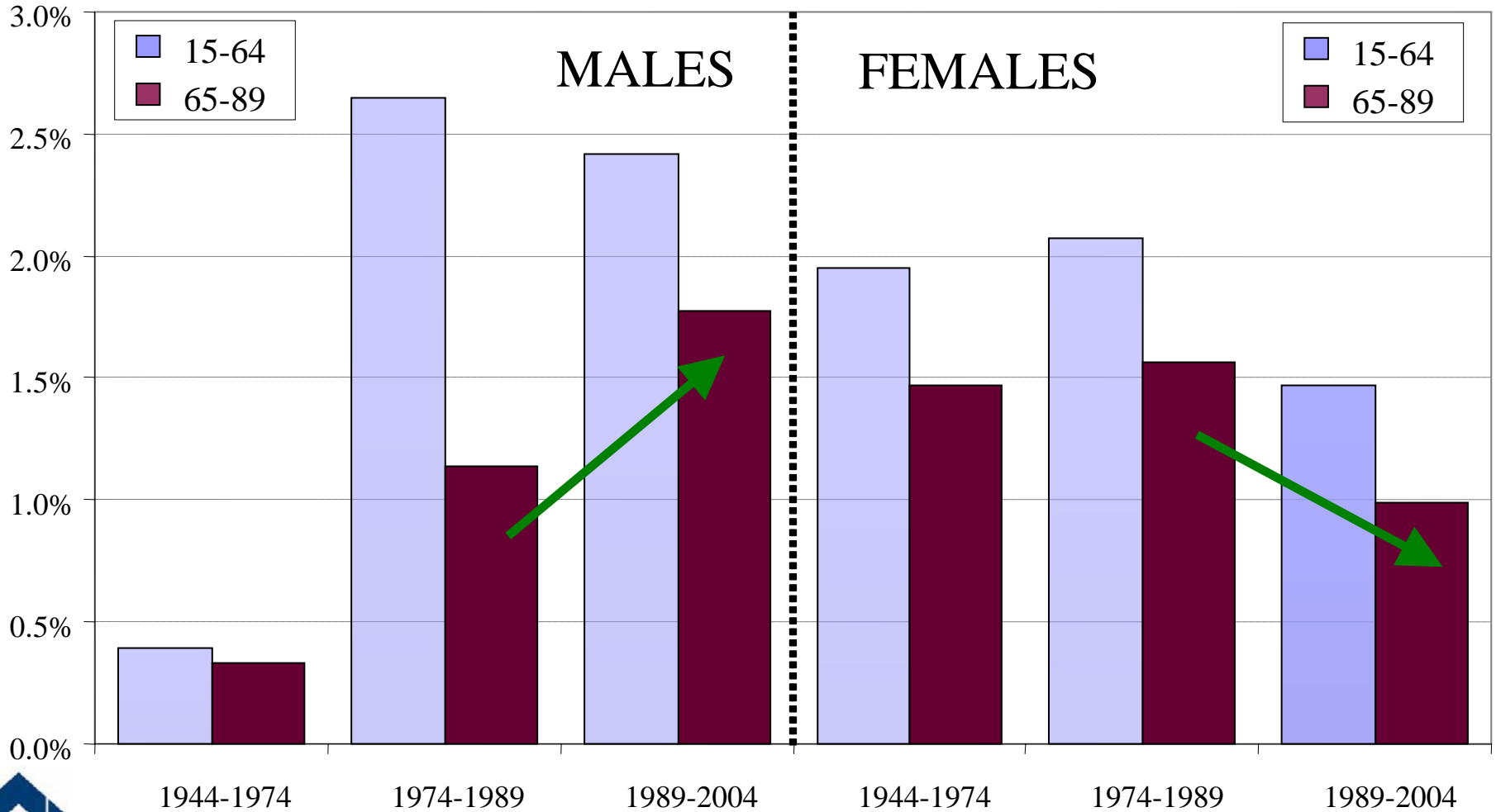
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Jasper National Park, Alberta

Average Annual Rates of Mortality Improvement (2007 Population-Weighted)



Annual Mortality Improvement Rates (1974-2004)

Age Group	Males		Females	
	1974-1989	1989-2004	1974-1989	1989-2004
15-44	2.8%	2.6%	2.8%	1.4%
45-64	2.6	2.4	1.9	1.5
65-84	1.2	2.0	1.6	1.2
85-89	0.8	0.8	1.5	0.4
90+	-0.6	0.0	0.1	-0.1
15-64	2.7	2.4	2.1	1.5
65+	<u>1.0</u>	<u>1.6</u>	<u>1.3</u>	<u>0.8</u>
0-84	1.8	2.2	1.8	1.3

Determining the ultimate improvement rate

Forward-looking females improvement rates

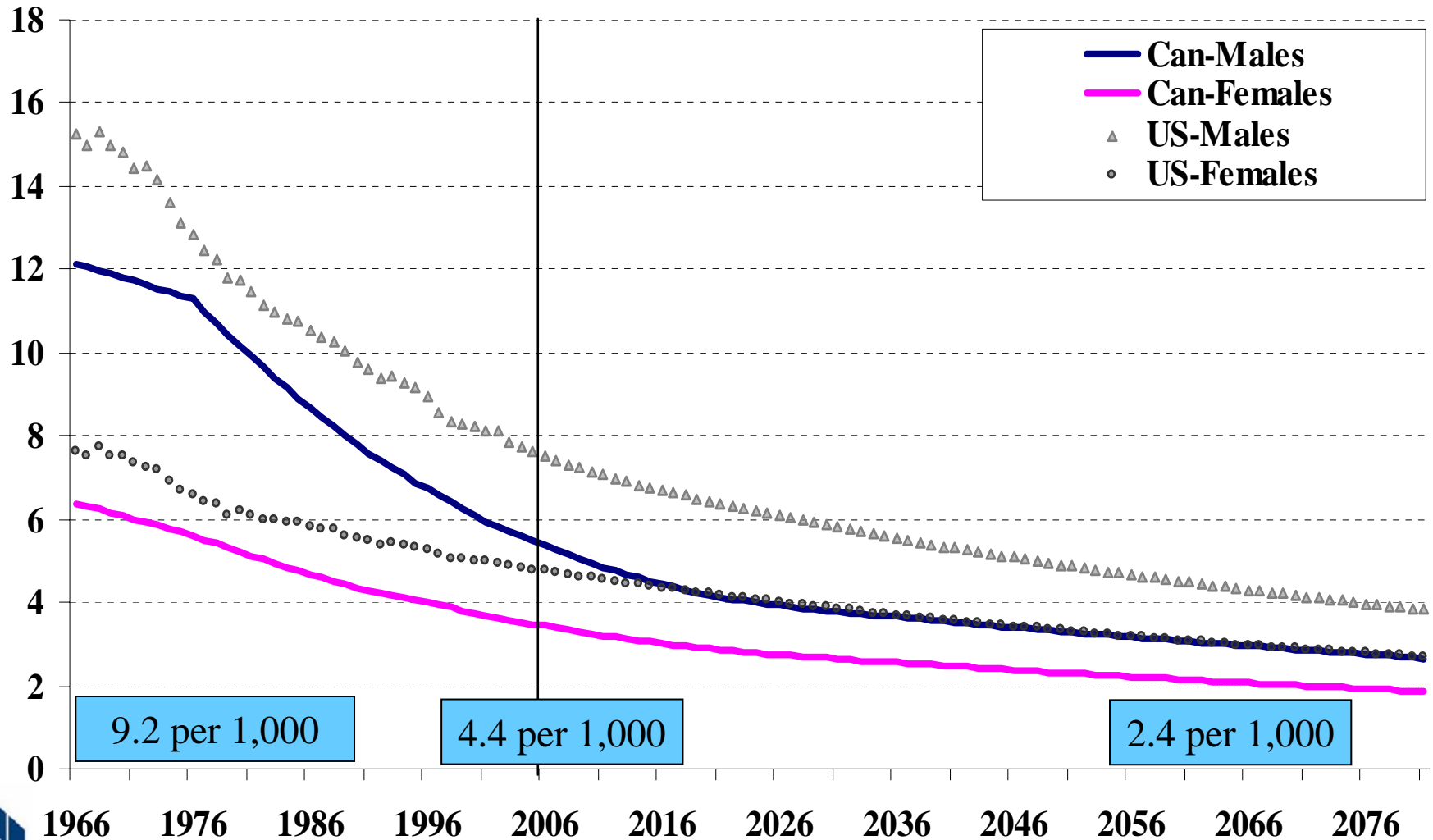
	Last 30 years		Continuing the trend for the next 30 years	
	1974-1989	1989-2004	2004-2019	2019-2034
0-44	3.41%	1.67%	0.81%	0.40%
0-64	2.33	1.53	1.01	0.67
0-74	1.99	1.45	1.05	0.76
0-79	1.86	1.40	1.05	0.79
0-84	<u>1.80</u>	<u>1.31</u>	0.96	<u>0.70</u>
65+	1.27	0.76	0.45	0.27
80-84	1.63	1.07	0.71	0.47
85-89	1.49	0.41	0.11	0.03
90+	0.14	-0.07	0.00	0.00

Assumed Annual Rates of Improvement

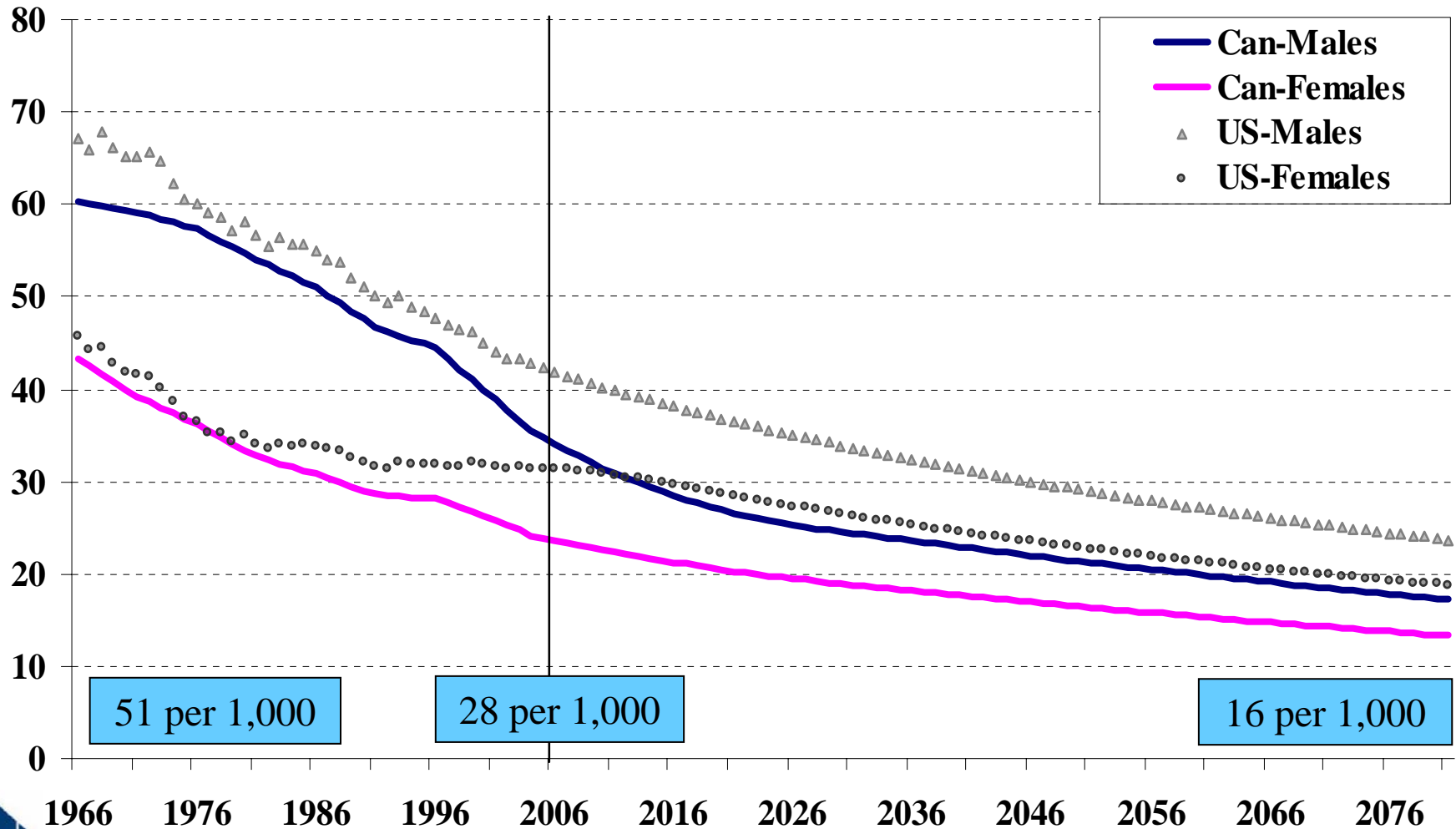
Age	<u>Males</u>		<u>Females</u>	
	<u>2005-2009</u>	<u>2029+</u>	<u>2005-2009</u>	<u>2029+</u>
	(%)	(%)	(%)	(%)
15-44	2.8	0.7	1.6	0.7
45-64	2.1	0.7	1.4	0.7
65-84	2.0	0.7	1.2	0.7
85-89	0.8	0.6	0.5	0.6
90-94	0.5	0.4	0.3	0.4
95+	0.0	0.4	0.0	0.4

For the next 25 years (2005-2029), the average annual rates of mortality improvement is respectively 1.5% and 1.0% for males and females aged between 65 and 84.

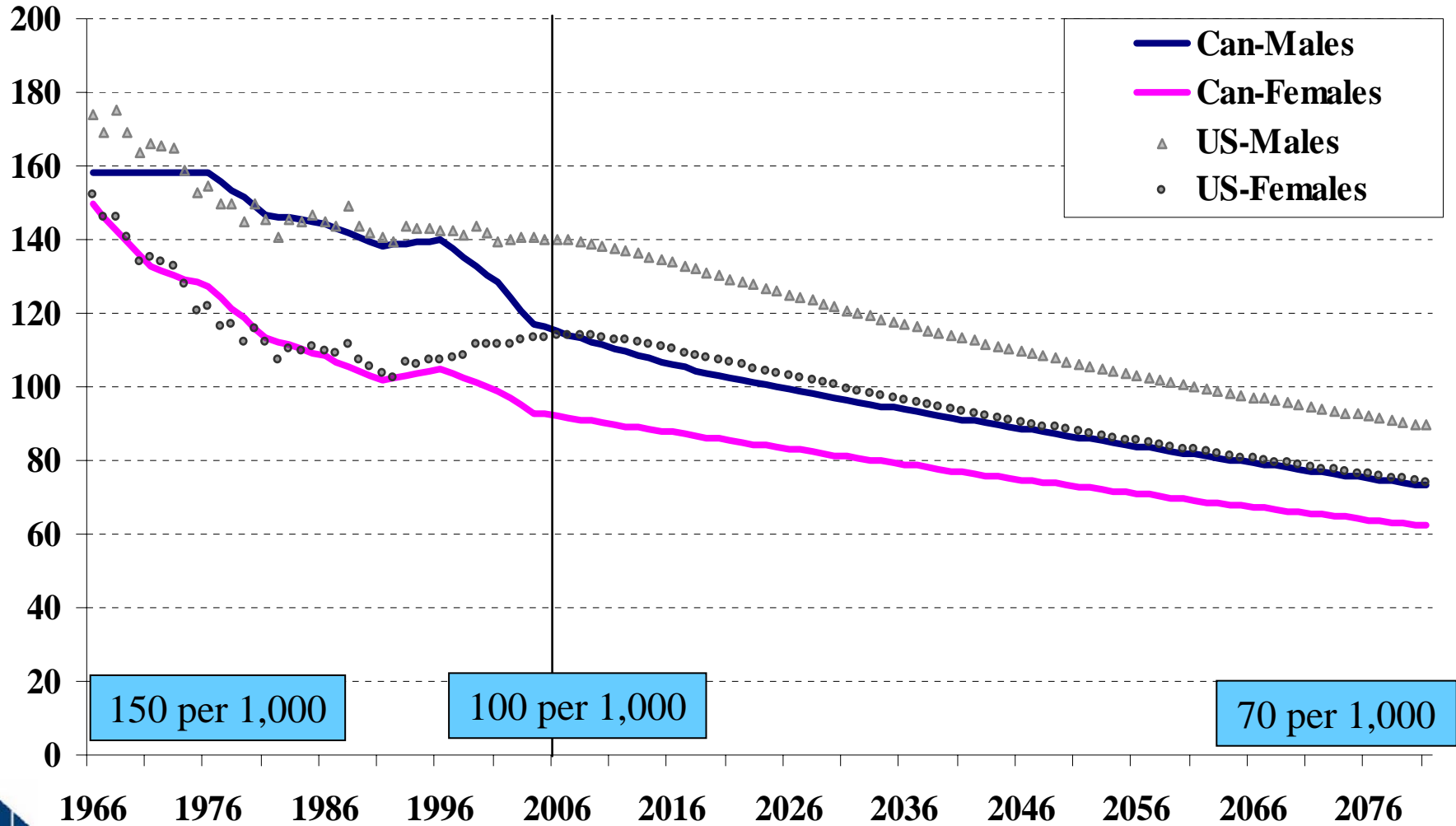
Projected Mortality Rates (Ages 45 to 64)



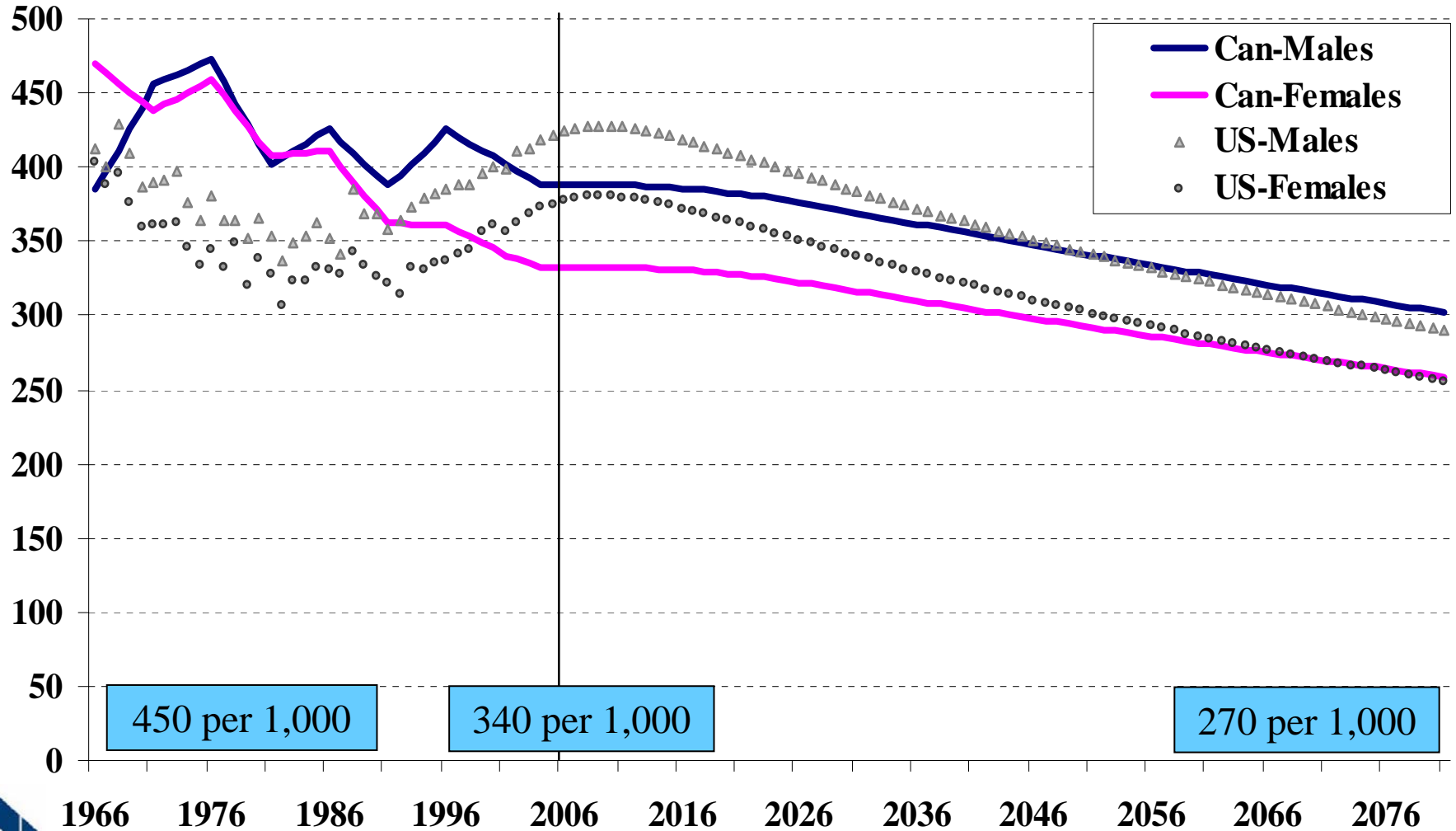
Projected Mortality Rates (Ages 65 to 84)



Projected Mortality Rates (Ages 85-99)

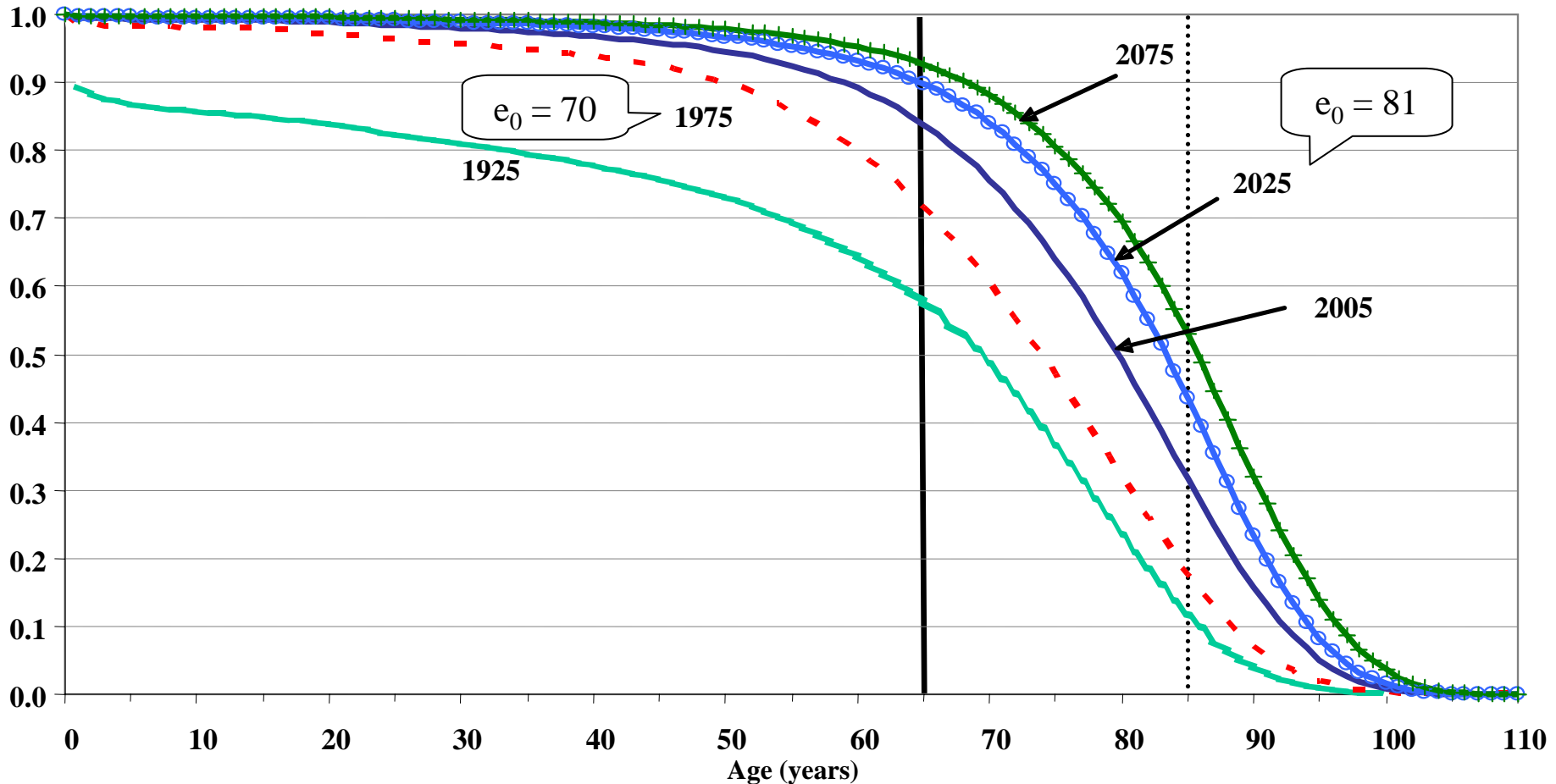


Projected Mortality Rates (Ages 100+)



Survival Curves at Birth for Canadian Males

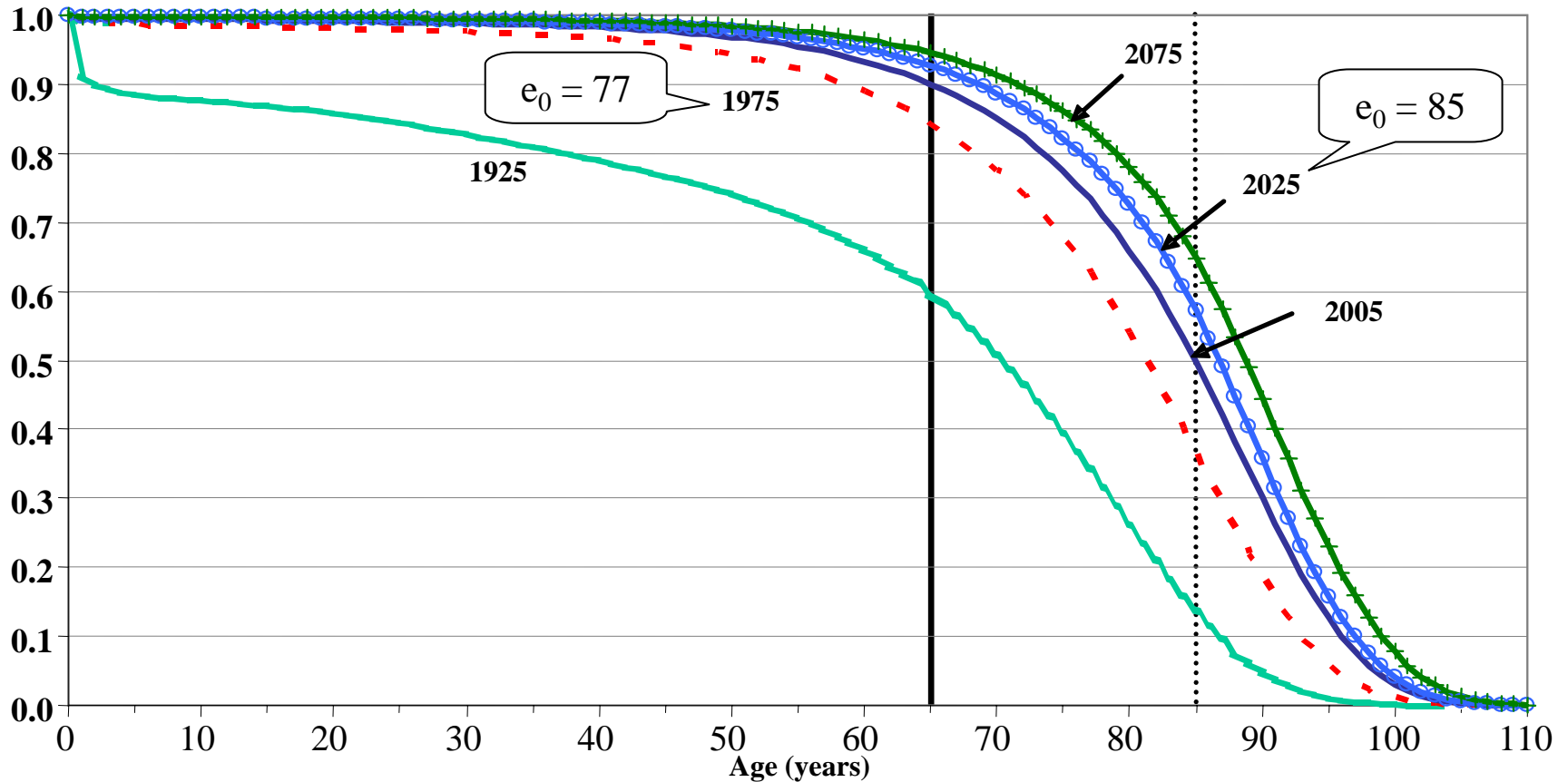
Probability of surviving from birth to given age



**70% of males could expect to die between ages 16 and 83 (1925),
between 65 to 89 (2000) and between 74 and 95 (2075).**

Survival Curves at Birth for Canadian Females

Probability of surviving from birth to given age



70% of females could expect to die between ages 24 and 84 (1925), between 71 and 94 (2005) and between 78 and 98 (2075).

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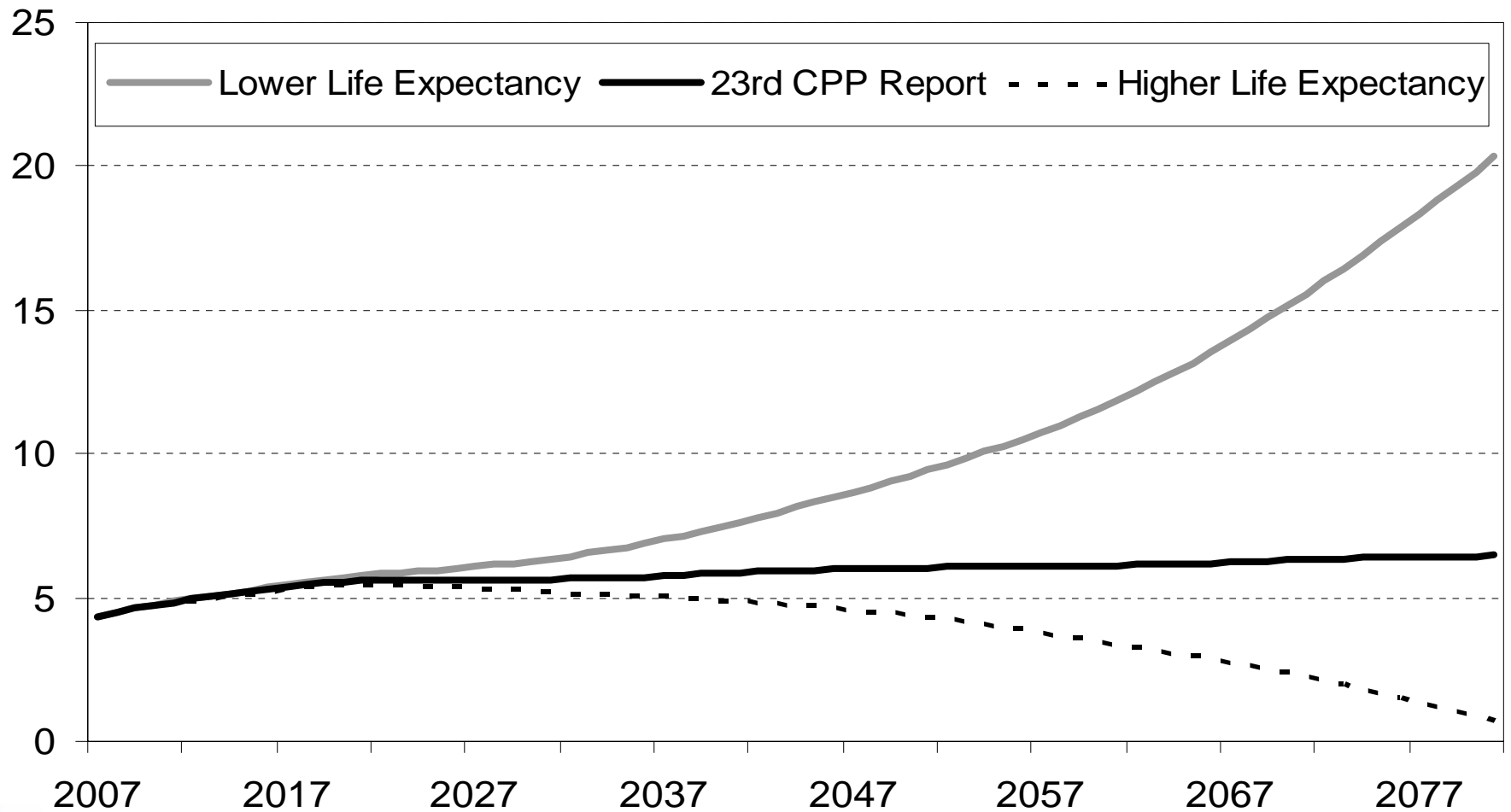
Cisco, British Columbia

Sensitivity test using stochastic process

Canadian Life Expectancies, with improvements after the year shown

At birth		Actuarial Report	Lower 95% CI	Higher 95% CI
Males	2007	84.5	79.1	88.4
	2050	87.4	80.8	91.3
	2075	88.8	81.6	92.8
Females	2007	87.7	80.6	92.0
	2050	90.2	81.9	94.6
	2075	91.5	81.9	95.9
At 65				
Males	2007	19.3	17.6	20.7
	2050	21.9	17.8	25.1
	2075	23.1	17.9	26.6
Females	2007	22.0	19.5	24.0
	2050	24.2	18.6	27.9
	2075	25.4	18.4	29.4

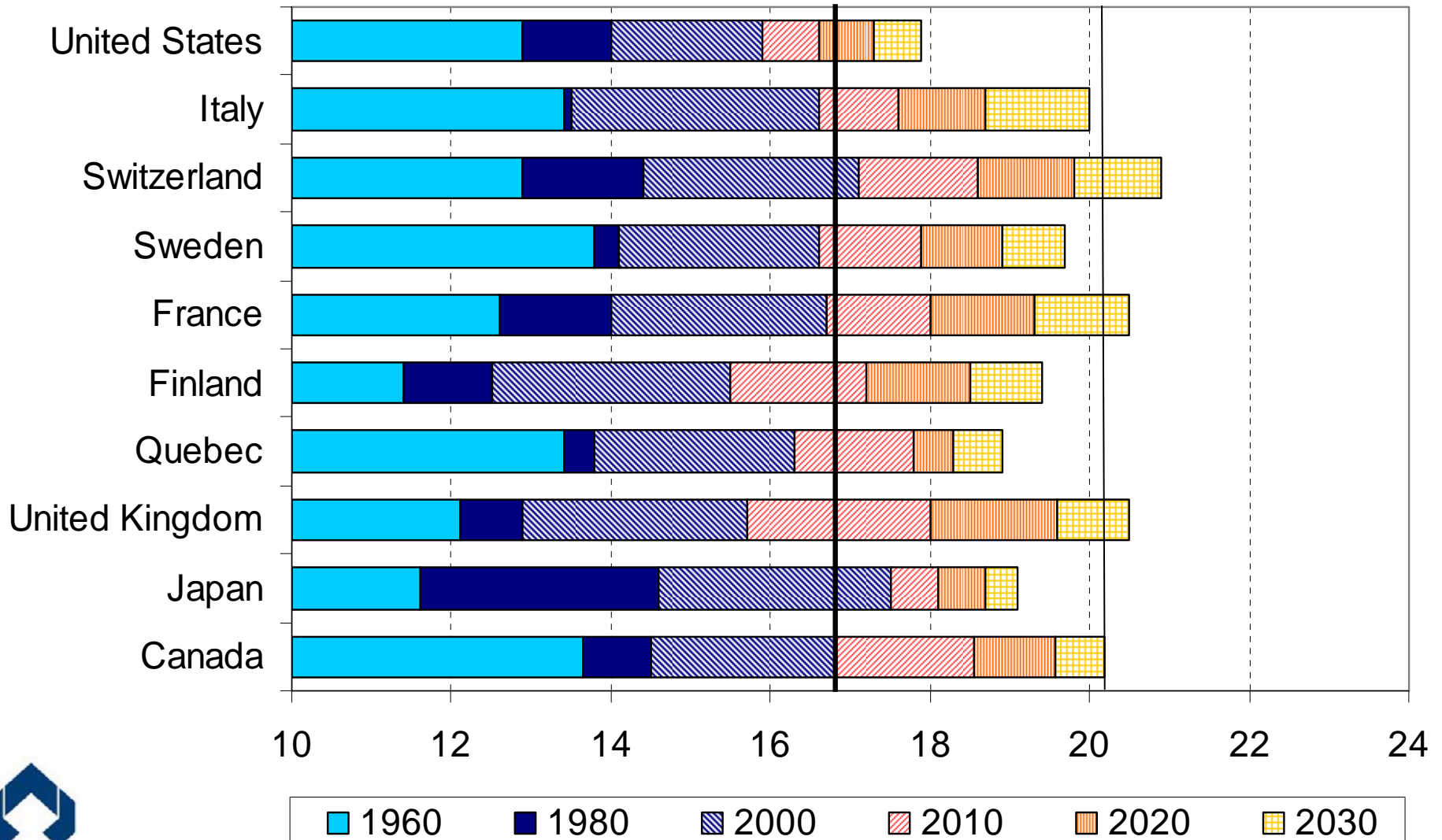
Evolution of Asset/Expenditure Ratio (9.9% Contribution Rate)



The minimum contribution rate falls between 9.2% and 10.2%

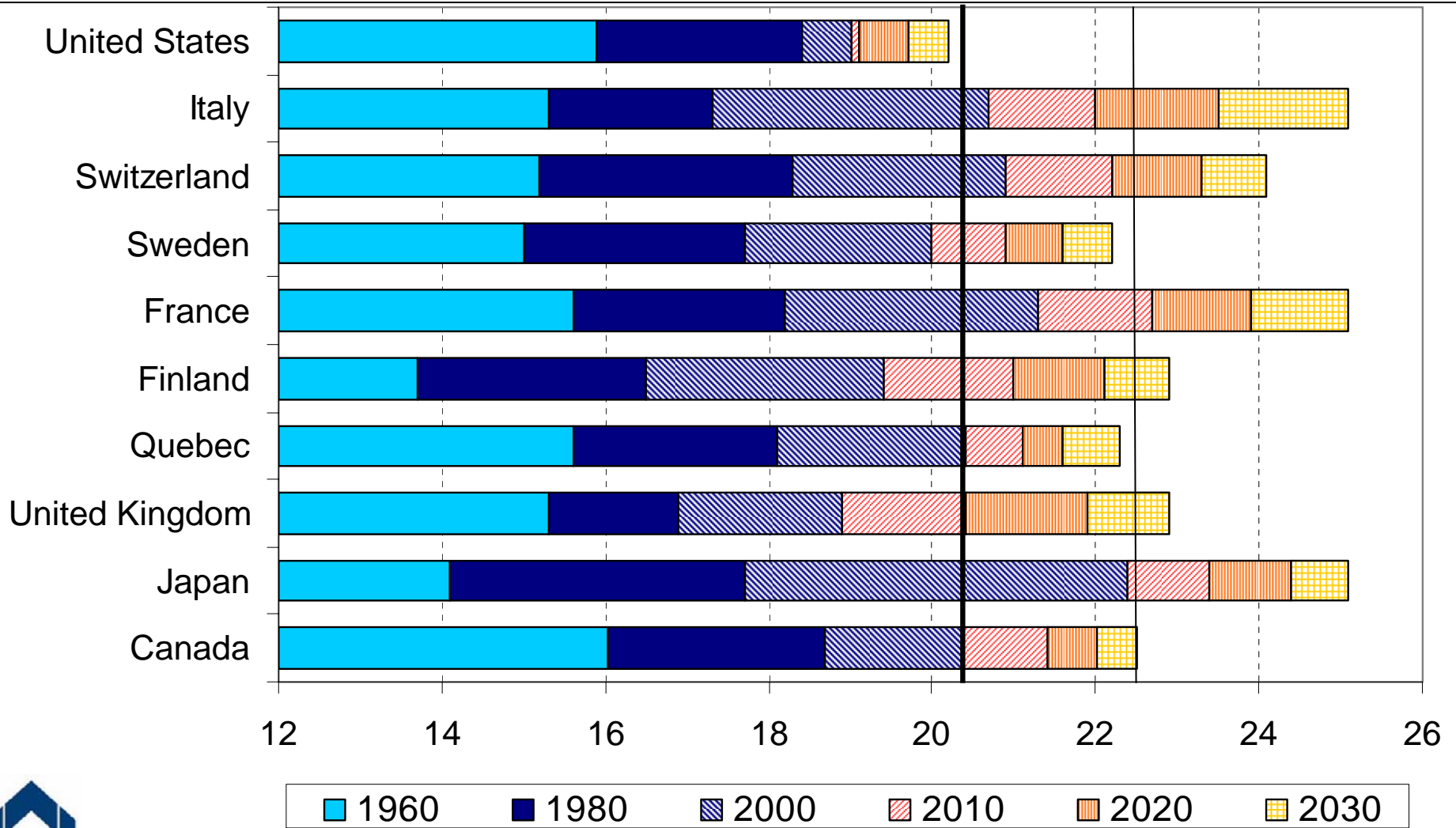
Life expectancy at age 65 for men, 2000-2030

(with no future improvements after year shown)



Life expectancy at age 65 for women, 2000-2030

(with no future improvements after year shown)





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Jean-Claude Ménard, Chief Actuary
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Thank you



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