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Financial Institutions Canada

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Funding Actuarial Valuations of Public Sector Pension Plans

*Presentation to the Financial Management Institute of
Canada*

by Jean-Claude Ménard, Chief Actuary



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25 November 2014

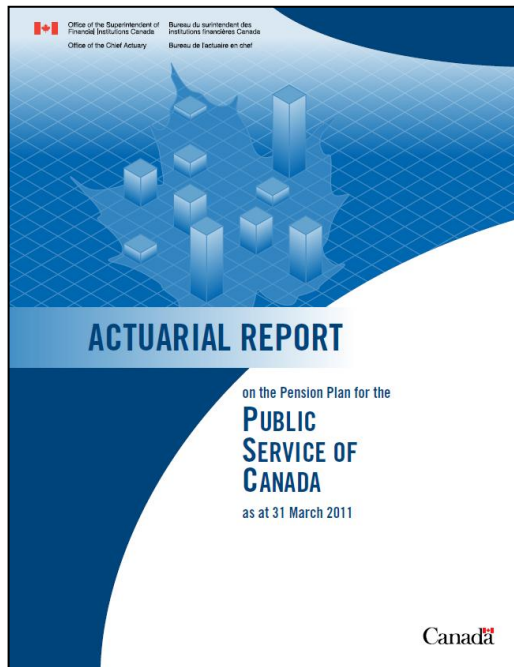
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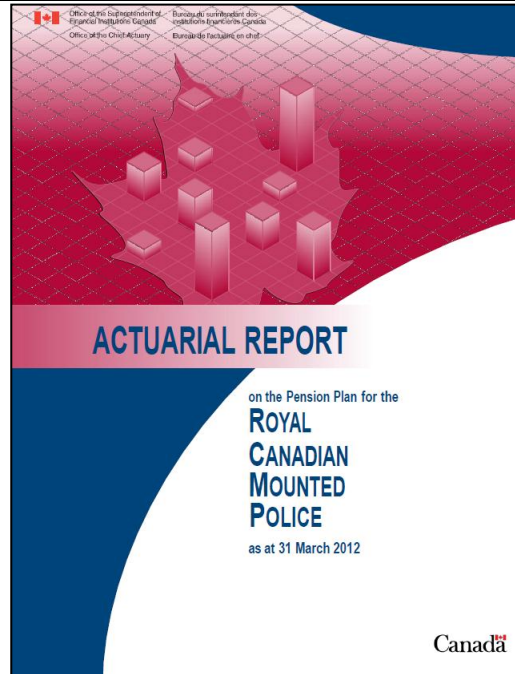
- Mandate: conduct statutory actuarial valuations on the
 - Canada Pension Plan (CPP) – **19M members**
 - Old Age Security Program (OAS) - **5M beneficiaries**
 - Federal public sector pension and insurance plans (Canadian Forces, Royal Canadian Mounted Police, Public Service, Members of Parliament, Federally Appointed Judges) – **0.8M members**
 - Canada Student Loans Program – **0.5M loans**
 - Employment Insurance Program – **17M workers**
- OCA also prepares additional actuarial reports whenever Bill of material changes to CPP is introduced before Parliament or amendments are made to the OAS Program and public sector pension plans.



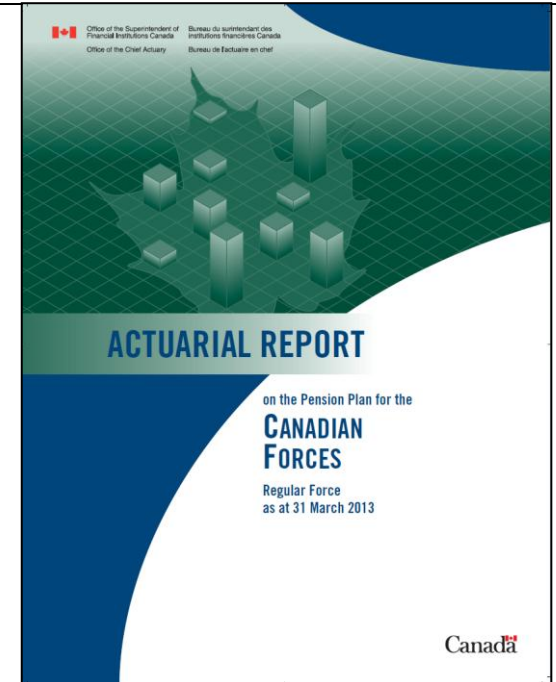
Membership of three largest public sector pension plans



318,000 contributors
258,000 beneficiaries



23,000 contributors
17,000 beneficiaries



72,000 contributors
115,000 beneficiaries

Public Service: Avg. age at retirement has been 59* with 28 years of service

RCMP: Average age at retirement has been 55* with 32 years of service

CF: Average age at retirement has been 49* with 27 years of service



*Average over past three years

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Plan Provisions

Retirement Benefit (Immediate Annuity)

- 2% per year of service (YS)
 - ✘ # of years of service not exceeding 35
 - ✘ highest average of pensionable earnings over 5 years
- Payable at retirement age:
 - 60 or age 55 with 30 YS (*PS pre-2013*)
 - 65 or age 60 with 30YS (*PS post-2012*)
- Payable at retirement age with 25 YS (*RCMP*)
- Payable at retirement age with 20/25 YS (*Canadian Forces*)
- Reduced at 65 by $0.625\% \times \text{CPP Average maximum pensionable earnings} \times \text{\# of years of CPP service (max. 35)}$
- Pensions are fully indexed to increases in the CPI
- Disability, survivor and children benefits are also provided



Member Contributions: 2012 changes to the PS Pension Plan result in two sets of contribution rates

- Goal is to reach employee/government cost sharing ratio of 50:50 by 2017 for Public Service Pension Plan
- The increase in member contribution rates decreases the government's contribution, but has no effect on the total cost of the Plan.

	PSSA (Group 1), RCMP, CF		PSSA (Group 2)	
	Below YMPE	Above YMPE	Below YMPE	Above YMPE
2013	6.85%	9.20%	6.27%	7.63%
2014	7.50%	9.80%	6.62%	7.89%
2015	8.15%	10.40%	7.05%	8.54%



Funding valuation of the DB plan sets future contributions requirements

- Funding valuation deals with the ongoing cost of the plan
 - It provides a basis for determination of future employee and employer contributions
- It is based on long-term demographic and economic assumptions that are likely to reflect future cash flows of the plan
- Canadian Institute of Actuaries standards require an actuary
 - To assume that the plan continues indefinitely
 - To chose assumptions representing best judgement of actuary as to the future events. Depending on the plan's funding policy assumptions may include provisions for adverse deviations
- Predictable pattern of contributions is important for plan's sponsor
 - It helps to avoid intergenerational transfers between different cohorts.



The actuary is responsible for all assumptions used to set contribution rates

- Each public sector pension plan legislation requires, in accordance with the *Public Pensions Reporting Act*, that a cost certificate and actuarial valuation report be prepared, filed with the designated Minister and tabled before Parliament
- The cost certificate is composed of:
 - Current service cost of the plan
 - An amount and/or % of pensionable payroll sufficient to cover the cost of all future benefits accrued in respect of one year of service
 - Contributions for prior service elections
 - Special payments made by Government to cover any deficits.



Actuary measures the actuarial liabilities

- Actuarial liabilities of the plans are equal to
 - the present value of all future benefits accrued as at that date in respect of all prior service, discounted using actuarial assumptions on projected real rate of return on
 - the Superannuation Account (pre-April 2000 service)
 - the Pension Fund (post-March 2000 service)
- Solvency valuation not required
- Accounting valuation assumptions are government best estimates



Main Valuation Assumptions

Economic Assumptions

- Inflation rate: **ultimate assumption 2.0%**
- Real wage increases: **ultimate assumption 1.0%**
- Real rate of return on the Fund: **ultimate assumption 4.1%**
- Real rate of return on the Account: **ultimate assumption 2.8%**

Demographic and Other Assumptions

- Mortality rates and life expectancies
- Promotional and seniority salary increases
- Rates of retirement
- Rates of termination / Rates of disability



Superannuation Account

- The public sector pension plans legislations require that the Superannuation Account records transactions, such as contributions, benefit payments, interest and transfers that relate to pre-April 1, 2000 service.
- The interest is credited quarterly to the Account at rates calculated as though the amounts recorded in the Superannuation Account were invested quarterly in a notional portfolio of Government of Canada 20-year bonds held to maturity.
- Thus the assumption on the projected yields for long-term Government of Canada bonds is needed.



Real rate of return assumption on Pension Fund is based on an investment portfolio with a diversified mix of assets

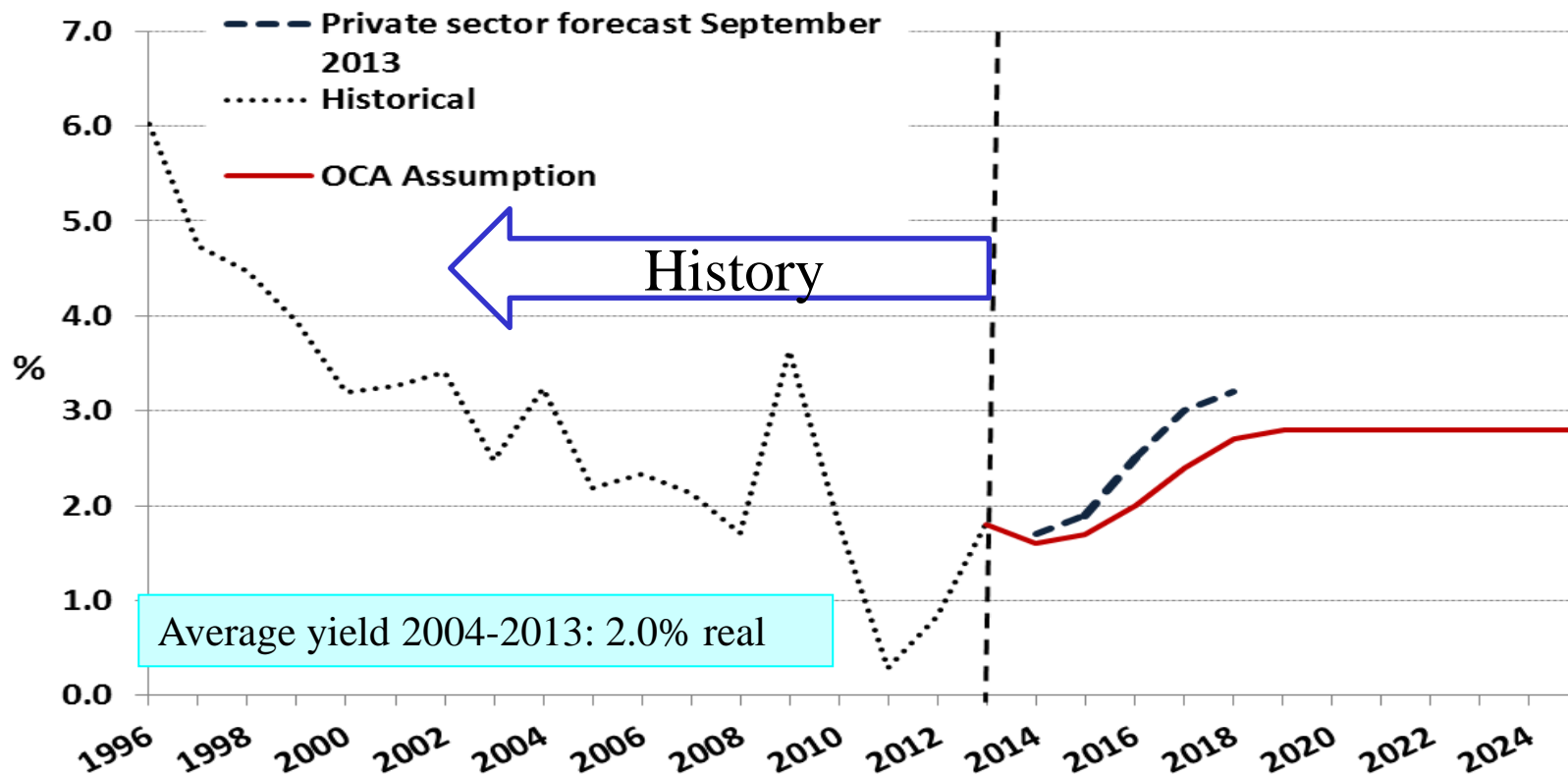
Real rate of return assumption for Pension Fund is derived using a building block approach:

- Government of Canada long-term bonds (used for both Fund and Account)
- Equity risk premium (additional return over bonds)
- Real rate of return by asset class
- Asset mix
- No provision for adverse deviation



Are the current low Government of Canada long-term marketable bonds yields “new normal”?

Real Yield on the Canada Long-Term Bonds (maturity 10 + years)



1996 to 2013: Government of Canada Marketable Bonds, Average Yield: Over 10 Years (VI22487), 2014+ : Projections

Forecasts for the Govt. Canada LT bonds with duration over 10 years are obtained by adjusting upwards the projections for 10-years Govt. Canada LT bonds by 0.4% for average private sector forecasts presented prepared in September 2013

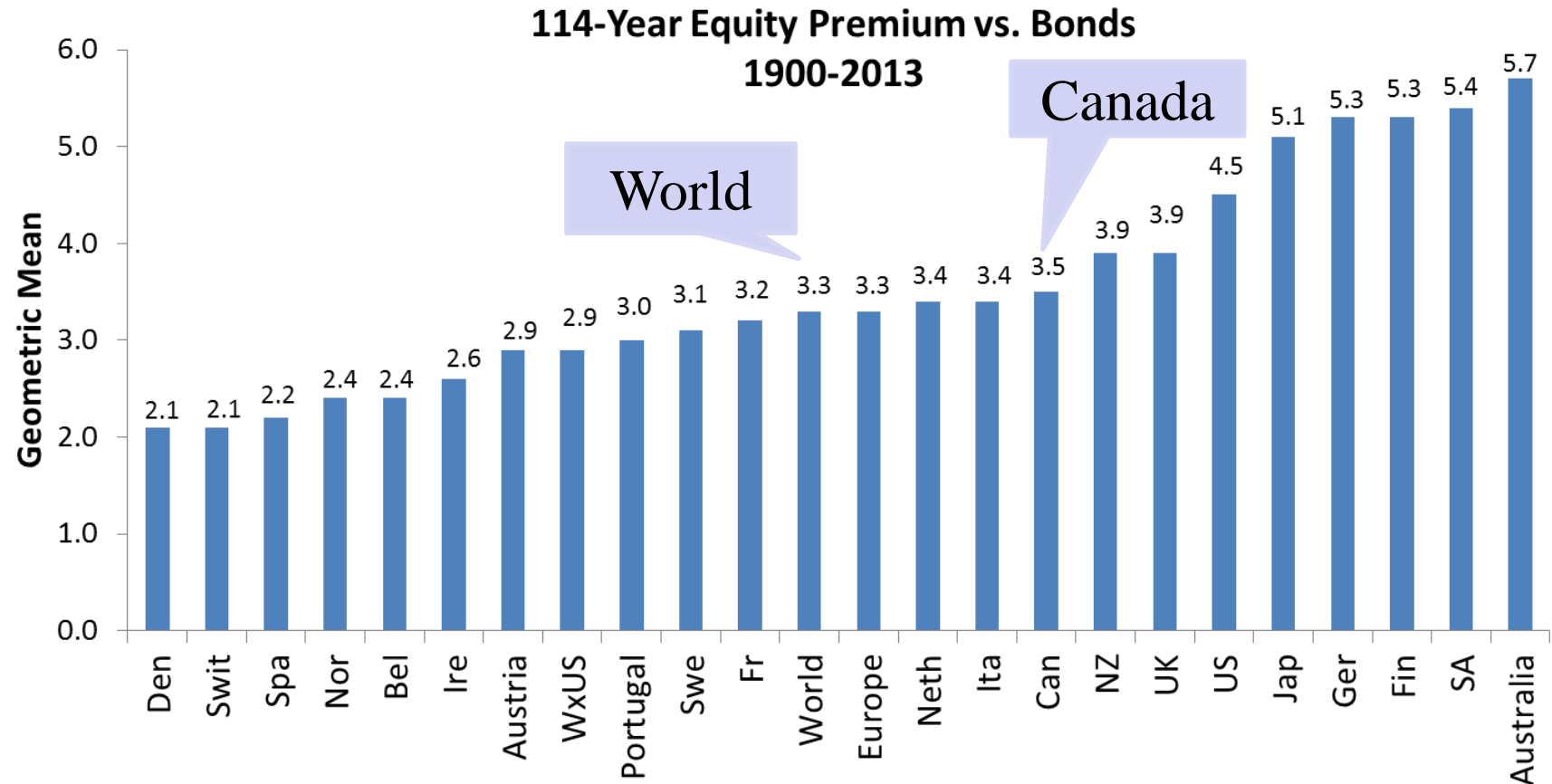


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The future ERP is expected to be lower than in the past (3.5% for Canada)



Source: Credit Suisse Global Investment Returns Yearbook 2014, Dimson, Marsh and Staunton

Real rate of return assumed by the OCA is in line with assumptions of peers

Reported asset mix and ultimate real rate of return assumptions

	Fixed Income	Equities	Alternative investments/RE&I	Real rate of return
CPP	30%	50%	20%	4.00%
QPP	27%	54%	19%	4.20%
PSSA /CFSA/RCMP	20%	55%	25%	4.10%
RREGOP	34%	48%	18%	4.25%
ON PSPP	36%	47%	17%	3.85%
OTPP*	41%	45%	38%	3.10%
OMERS	57% Public / 43% Private			4.25%
HOOPP	54% Debt / 46% Equity			3.75%
AB PSPP	28%	47%	25%	3.95%
BC PSPP	29%	52%	19%	3.50%

Due to current low interest rates environment, we assume real rate of return of 3.4% for the next 5 years and 3.7% over next 10 years.

* Offset by 24% of borrowed money market securities.



Mortality rates of public sector pension plans vary from those of the general population

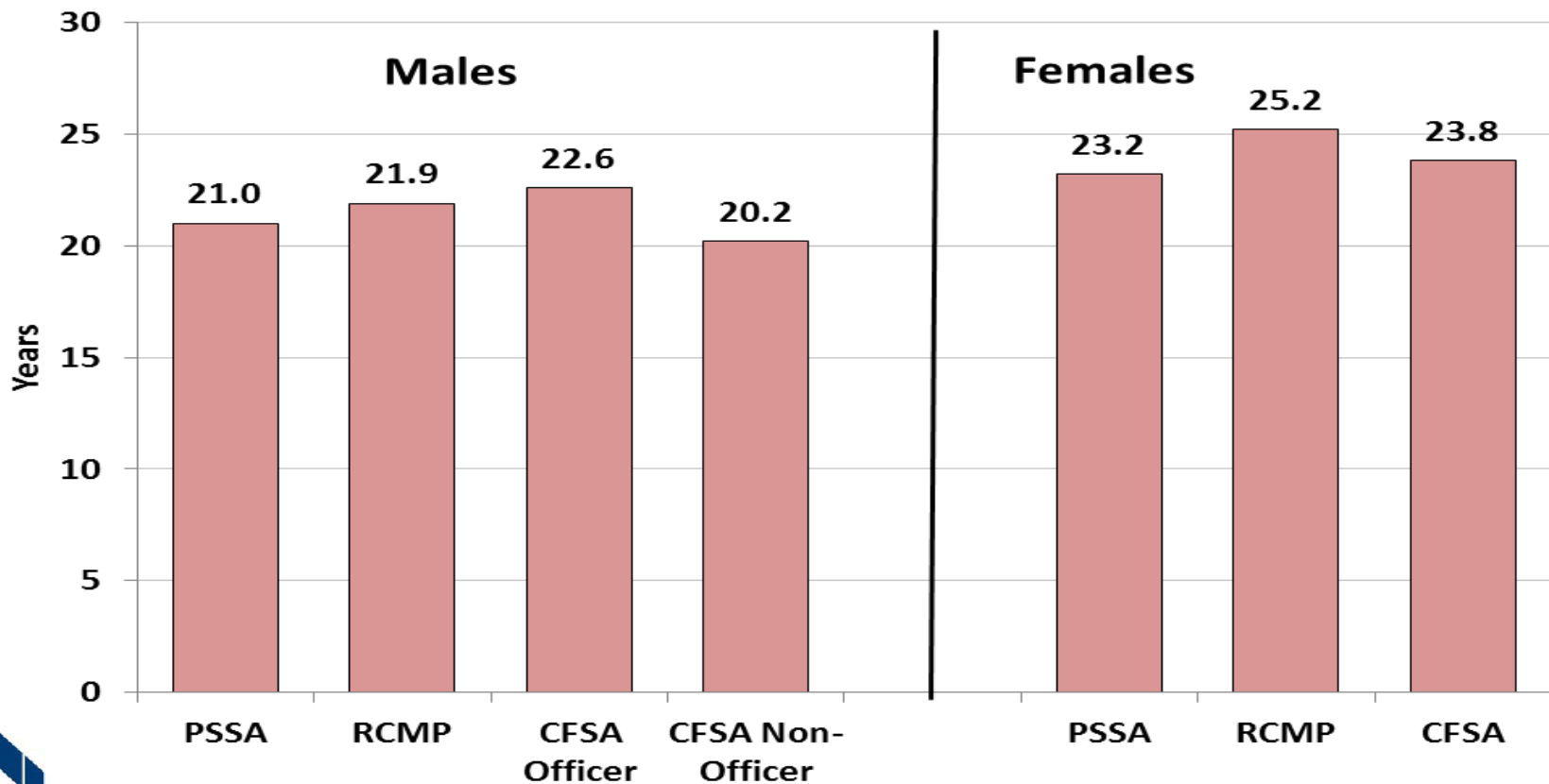
- Mortality rates of a particular subgroup depend on its characteristics, such as level of education, level of income, industry of employment, etc.
- In developing mortality assumptions for public sector pension plans, mortality experience of each plan is analysed

	Initial Mortality Rates	Mortality Improvement Rates
Public Sector Pension Plans	Based on actual public sector pension plans experience.	Based on trends in Canadian mortality and OCA best-estimates. Usually the same as for the CPP actuarial reports.



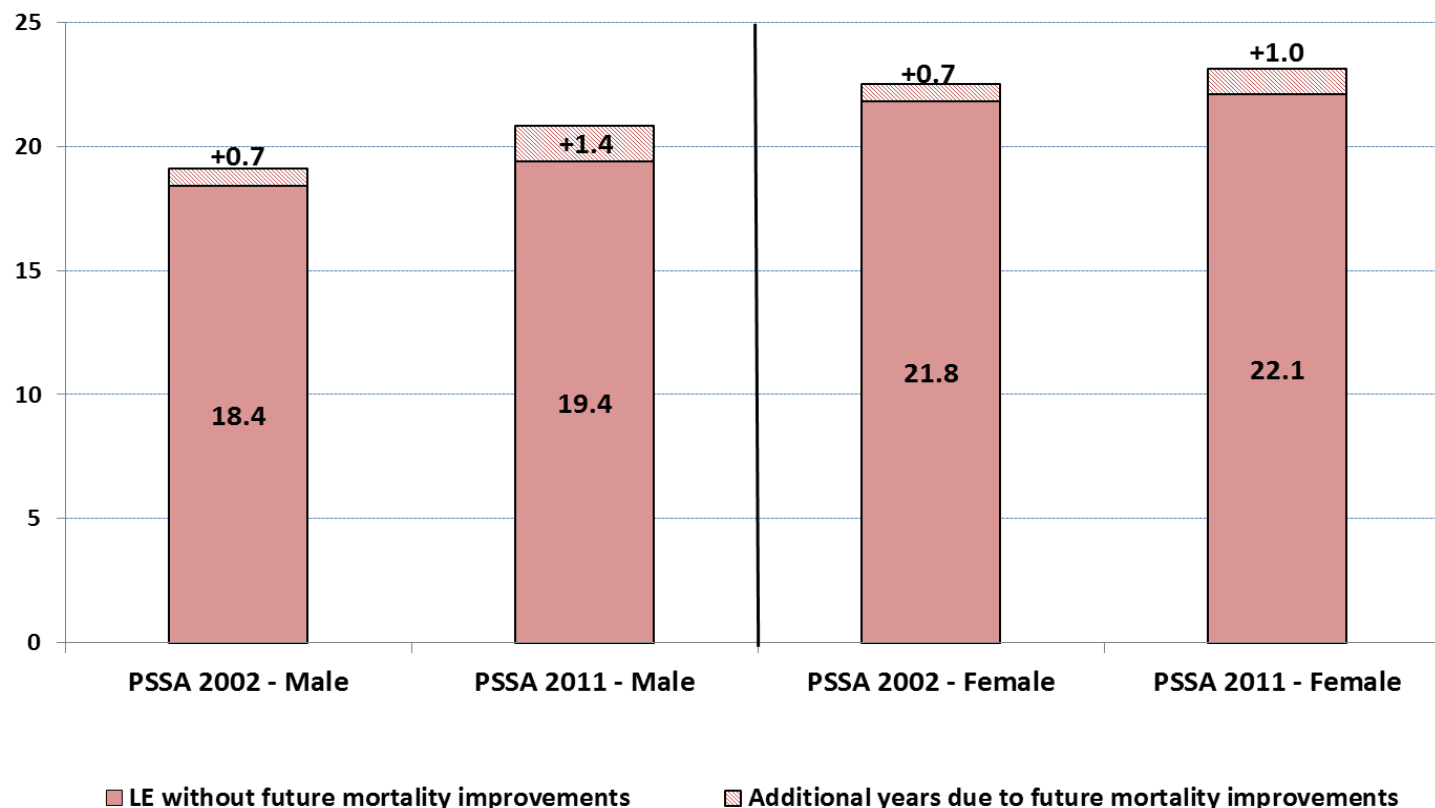
Mortality may vary for different subgroups within the same pension plan

Life Expectancy at Age 65 with Future Mortality Improvements –
the latest actuarial reports
Plan Year 2014



Mortality assumptions for public sector pension plans are monitored and updated with every actuarial report

Life Expectancy at Age 65 without and with Future Mortality Improvements – 2002 and 2011 PSSA Actuarial Reports Plan Year 2012



The revision of mortality assumptions can have a sizeable impact on the actuarial liability of the plans

PSSA Liabilities as at 31 March 2011 under Mortality Assumptions of the 2002 and 2011 PSSA Actuarial Reports

	PSSA Liabilities (\$ millions)		
	Superannuation Account	Pension Fund	Total
With mortality assumptions of the 2011 PSSA Actuarial Report	93,057	46,849	139,906
With mortality assumptions of the 2002 PSSA Actuarial Report	89,735	45,566	135,301
Difference	(3,322)	(1,283)	(4,605)
Difference %	(3.6%)	(2.7%)	(3.3%)



Source: Actuarial Study No. 14, Mortality Study on the Public Service of Canada, September 2014

The financial impact of future mortality improvements on the actuarial liability of the plans is also important

PSSA Liabilities as at 31 March 2011 with and without Mortality Improvements

	PSSA Liabilities (\$ millions)		
	Superannuation Account	Pension Fund	Total
With mortality assumptions of the 2011 PSSA Actuarial Report	93,057	46,849	139,906
Without mortality improvements	89,688	45,064	134,752
Difference	(3,369)	(1,783)	(5,154)
Difference %	(3.6%)	(3.8%)	(3.7%)



Source: Actuarial Study No. 14, Mortality Study on the Public Service of Canada, September 2014

Auditor General 2014 Spring Report on future mortality improvements

- Auditor General in his report highlighted the importance of taking into account future mortality improvements in assessing the sustainability of public sector pension plans
- The actuarial liabilities of the three major public sector pension plans as of 31 March 2013 would be \$7.7 billion (3.4%) lower if future mortality improvements were not considered



Pension Plan for the Public Service of Canada Mortality Study (OCA Actuarial Study No. 14)

- In February 2014, the Canadian Institute of Actuaries (CIA) has finalized the first ever Canadian Pensioners Mortality tables (CPM2014) as well as a projection scale (CPM-B)
 - Private/public pension plans
 - Level of income
- Mortality rates of the CPM tables are lower than those of the 2011 PSSA Actuarial Report
- This prompted our decision to conduct a peer review of the mortality tables used for the 2011 PSSA Actuarial Report
 - This peer review took the form of a stand-alone mortality study
 - OCA Actuarial Study No. 14 was published on 29 September 2014 and may be found on OSFI's website (<http://www.osfi-bsif.gc.ca/Eng/Docs/pscms.pdf>)



Based on the mortality rates developed under the study, the mortality rates of the 25th CPP actuarial report and the mortality rates of the CPM tables:

- A male federal public servant aged 65 in 2010 is expected to live one year longer than a Canadian male. For female, this difference is 0.6 years
- Life expectancies of federal public servants aged 65 in 2010 are similar to those of members of private sector pension plans
- Members of other public sector pension plans are expected to live longer than federal public servants



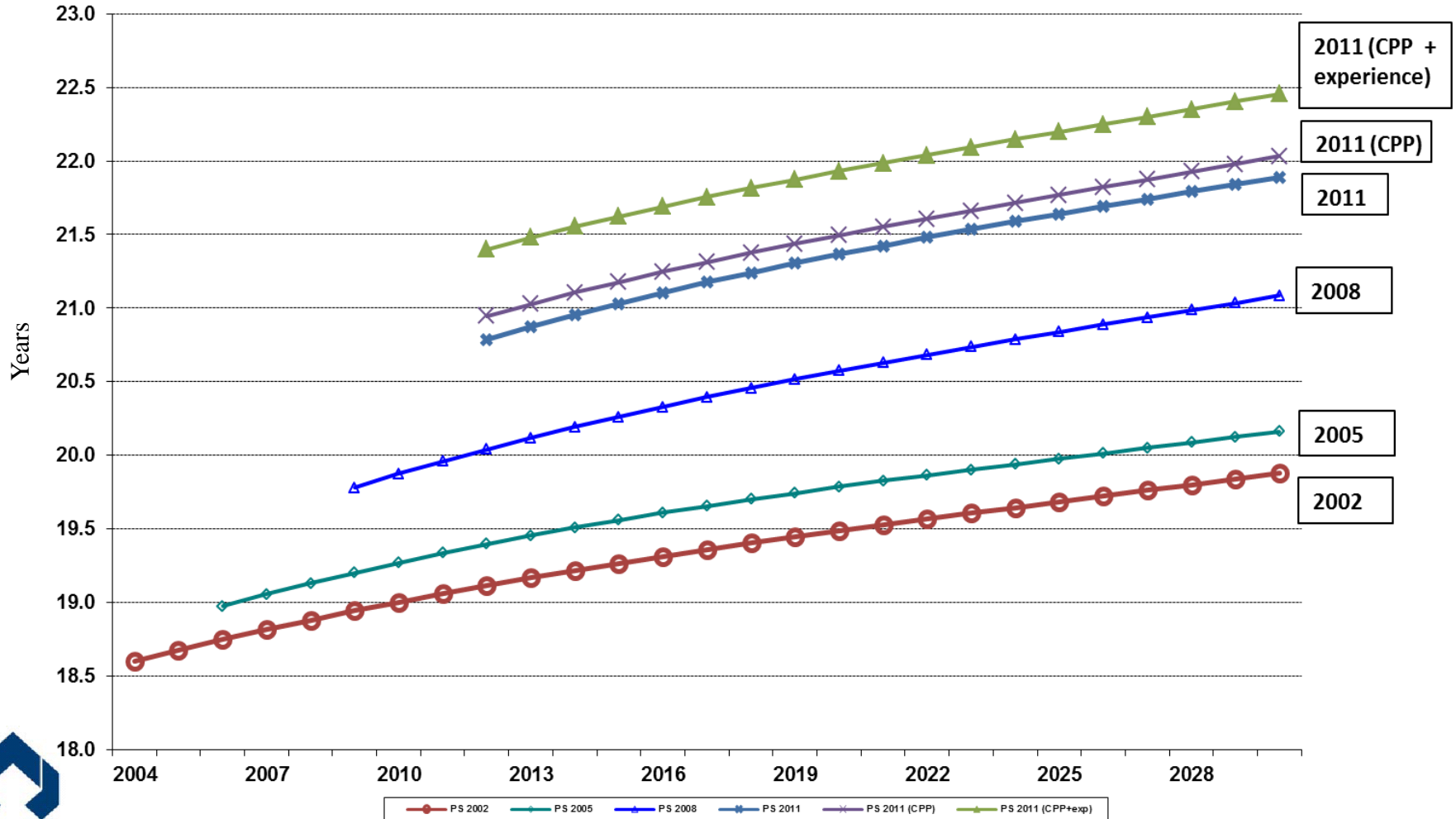
Main Findings of the Pension PSSA Mortality Study

- **The mortality assumptions used for the purpose of the 2011 PSSA Actuarial Report properly use the available information and are accurate and reliable**
- It is recommended that in developing mortality rates for the next PSSA statutory report more weight be given to recent experience
- It would be advisable to develop mortality rates taking into account the level of income
- CIA improvement scale CPM-B is comparable with the mortality improvement scale used for the purpose of the 2011 PSSA actuarial report.



Updating the mortality assumption for the next PSSA actuarial report by giving more weight to recent experience and updating the mortality improvement based on the most recent CPP report would result in an increase of the life expectancy of a male age 65 of approximately 0.6 years

**Life Expectancy of Public Service Male at age 65 by plan year
(with future mortality improvements)**



Conclusion

- Section 1.24 of the Auditor General Spring 2014 Report:
“The OCA determines the demographic and economic assumptions for funding valuations, which occur every three years, in an independent manner. All actuarial assumptions are best-estimate assumptions made by the OCA. We found that the Secretariat, National Defence, and the RCMP respected the independence of the Chief Actuary”
- Retirement is expensive and could become even more expensive in the future with improved longevity and uncertain future global economic growth.





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Appendix

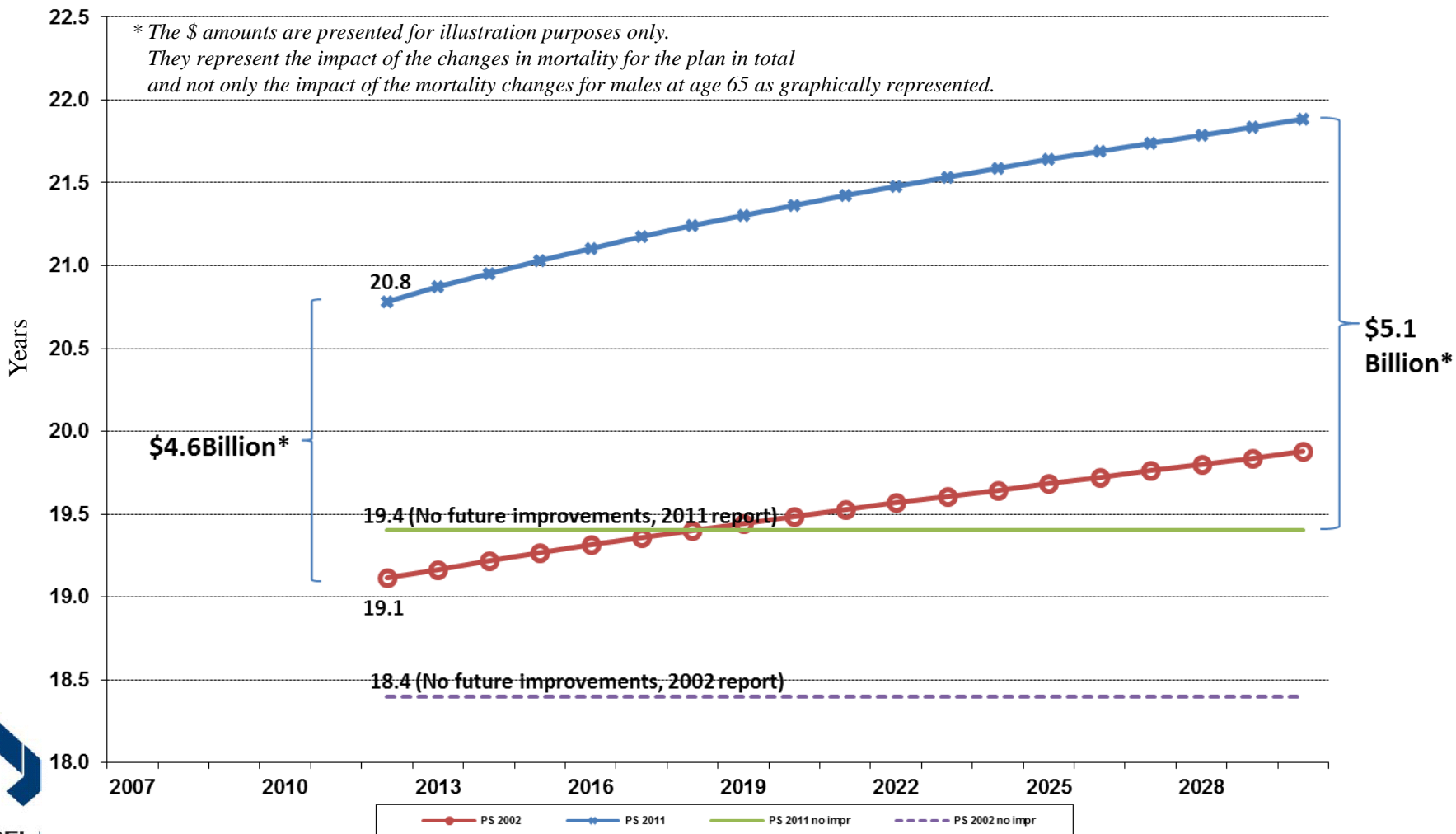


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The impact of the revision of mortality assumptions between the 2002 and 2011 PSSA Reports and the impact of the future mortality improvements in the 2011 PSSA Report can be represented graphically*

Life Expectancy of Public Service Male at age 65 by plan year



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