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Old Age Security Program Mortality Experience

Actuarial Study No. 23

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1 Executive Summary

1.1 Purpose

This is the fourth Old Age Security (OAS) program mortality experience study published by the Office of the Chief Actuary (OCA).

The OAS pension is a monthly benefit available to most Canadians 65 years of age or older, who meet residence and legal status requirements. The OAS pension is subject to a repayment amount or recovery tax for those with income exceeding a specified level. The OAS program also includes a Guaranteed Income Supplement (GIS) and Allowance monthly benefits paid to residents of Canada who receive a full or partial OAS pension and who have little or no other income. To receive the GIS, an individual must be an OAS pensioner. There Allowance benefit is paid to those aged 60 to 64 who are either the spouses or common-law partners of GIS recipients or are widowed.

Similar to the three preceding OAS mortality studies (Actuarial Studies Nos. 5, 11, and 17), this study excludes OAS benefits paid under international social security agreements and covers only benefits paid under the domestic OAS program. As well, like in the previous studies, this study covers OAS pensioners and GIS beneficiaries.

The availability of an administrative OAS beneficiaries database provided by Service Canada allows for a more accurate measurement of the level and trend in mortality experienced by the oldest portion of the Canadian population over the period from 1 January 1999 to 31 December 2019. As the experience period considered ends in 2019, the impacts of the COVID-19 pandemic are not reflected in this study.

The longer experience period of this study (from 1999 to 2019 inclusive) relative to its predecessors provides for the observation and analysis of longer-term trends of mortality. This study accounts for over 99 million life-years of exposure and about 4 million deaths.

The OCA will use the results of this study to assess the mortality characteristics of the overall Canadian population and of OAS program beneficiaries when producing its next triennial Canada Pension Plan (CPP) and OAS program actuarial reports.

1.2 Scope

Section II describes the data and methodology used to analyze the OAS program beneficiary mortality experience. Section III presents the overall mortality experience of OAS beneficiaries. Also included in section III is a comparison with the Canadian population mortality.

A comparison of mortality rates by type of benefit is presented in Section IV, while Section V presents the level of mortality by marital status and type of benefit. Section VI presents the level of mortality by place of birth. Section VII next presents an analysis of the trends in mortality improvement rates over the experience period. A conclusion of the study then follows in Section VIII. Detailed tables are provided in the Annex of the study, and lists of the references used and contributors to the study are provided at the end.

Throughout this study, the terms “OAS” and “OAS program” are used interchangeably to refer to the OAS program. Also, all life expectancies presented in this study refer to period life expectancies (i.e., without assumed future mortality improvements). Lastly, all figures shown in the study pertain to OAS program beneficiaries aged 65 and older, unless otherwise indicated.

1.3 Main Findings

1.3.1 Life Expectancies of OAS Beneficiaries

- In 2019, the life expectancies at age 65 for OAS beneficiaries are 19.4 years for males and 22.2 years for females. These are 3.3 years and 2.3 years higher than the corresponding life expectancies observed in 1999.
- The gap in life expectancies between females and males decreased from 3.8 years in 1999 to 2.8 years in 2019.
- Older Canadians are living longer but the growth in life expectancy of one month per year over the period from 2015 to 2019 has been lower than the two months per year experienced over the previous 15 years period 2000 to 2014. Similar trends have been observed in the United States and in the United Kingdom.

1.3.2 Life Expectancies by Type of Benefit

- Over the last 20 years, life expectancy at age 65 for males has increased from 16.9 years in 1999 to 20.3 years in 2019 for those not receiving the GIS benefits and from 14.5 years in 1999 to 17.4 years in 2019 for those receiving the GIS benefit.
- In comparison, for females, life expectancy at age 65 has increased from 20.8 years in 1999 to 23.2 years in 2019 for those not receiving the GIS benefit and from 18.8 years in 1999 to 20.7 years in 2019 for those receiving the GIS benefit.
- As such, the gap in life expectancies at age 65 between beneficiaries not receiving the GIS and those receiving the benefit has increased over the period 1999 to 2019. In 1999, the differential was 2.4 years for males and 2.0 years for females, while in 2019 the differential is 2.9 years for males and 2.5 years for females.

1.3.3 Life Expectancies by Marital Status and Type of Benefit

- In 2019, the life expectancies at age 65 are 20.7 years for married males and 16.8 years for single males. The corresponding life expectancies at age 65 for married and single females are 23.6 years and 21.1 years.
- In 2019, single males experience mortality that is about 2.7 times the level of married beneficiaries at age 65. In comparison, single females experience mortality that is about 1.9 times the level of married beneficiaries.
- In 2019, for both sexes in general, single beneficiaries in receipt of the GIS have the lowest life expectancies while married beneficiaries not receiving the GIS have the highest life expectancies.

1.3.4 Life Expectancies by Place of Birth

- OAS beneficiaries born outside Canada experience lower mortality than those born in Canada. This may be explained by the “healthy immigrant effect” (Vang et al., 2015), which results from several factors, including medical and employability screening prior to entry to Canada as well as cultural and lifestyle characteristics.
- In 2019, the life expectancies at age 65 are 20.8 years for male OAS beneficiaries born outside Canada and 18.4 years for those born in Canada. The corresponding life expectancies for females at age 65 are 23.6 years and 21.4 years.

- The gap between the life expectancies at age 65 of OAS beneficiaries born outside Canada and those born in Canada has increased for both sexes over the period 1999 to 2019. In 1999, the differential by place of birth was 1.5 years for males and 0.9 of a year for females. In 2019, the differential by place of birth for both males and females is about 2.2 years.

1.3.5 Mortality Improvements

- The average annual mortality improvement rate for males in the age group 65 to 74 over the period 2000 to 2014 has been 2.7%, and this compares to a level of 1.0% over the more recent period 2015 to 2019. In comparison, for the same age group, the average annual mortality improvement rate for females has also decreased, standing at 1.9% for the 2000 to 2014 period and at 1.0% for the 2015 to 2019 period.
- For both sexes, mortality improvements for beneficiaries in receipt of the GIS have generally been lower than for beneficiaries not receiving the GIS. Over the period 2000 to 2019, for ages 65 to 74, those in receipt of the GIS experienced an average annual mortality improvement rate of 1.6% and 1.1% for males and females, respectively. These compare to average annual improvement rates of 2.5% for males and 1.8% for females not in receipt of the GIS. These improvement rates have been somewhat lower over the more recent period 2015 to 2019.
- The average annual mortality improvement rates for OAS beneficiaries are at the same levels as those derived from the general population mortality.

1.4 Conclusion

In general, this study confirms the results that were obtained by the previous OAS program beneficiary mortality studies. The analysis by type of benefit received shows that beneficiaries who do not receive the GIS experience lower mortality compared to those who receive the GIS. The analysis by marital status shows that beneficiaries who are married experience lower mortality compared to single beneficiaries. The analysis by place of birth shows that beneficiaries who were born outside Canada experience lower mortality compared to beneficiaries who were born in Canada.

The study also reveals that mortality improvement rates over the more recent period from 2015 to 2019 have been somewhat lower than improvement rates experienced over the previous 15 years period from 2000 to 2014.

2 Data and Methodology

2.1 Data Source and Validation

The main source of data for this study is an administrative seriatim (i.e., by non-identifiable individual records) OAS program beneficiaries database that was provided to the OCA by Service Canada, which is the administrator of the OAS program. The OAS database contains information on the amount of regular monthly benefits received by each OAS program beneficiary along with the associated payment status (i.e., whether in pay, suspended, or terminated) at each 31 December for years 1999 to 2019 inclusive. The OAS database allows for the identification of those receiving the GIS and Allowance benefits in addition to the OAS pension due to having no or very low income[1].

The Canada Revenue Agency (CRA) database available to the OCA was also used for this study to determine the date of death and the marital status, if that information was not available solely from the OAS database. Statistics Canada also provided general population mortality data for Canada by age and sex for individual years 1999 to 2019 based on Canada Life Tables (CLT).

Data validation was performed on all data records. The validation indicated that only a small portion of all beneficiary records (less than 0.1% of records) had incorrect or missing data, and thus needed to be discarded.

This study is based on the number of deaths and life-years of exposures determined for each class of OAS beneficiaries. This study accounts for over 99 million life-years of exposure and about 4 million deaths. For any given calendar year, the term "life-years of exposures" (or simply "exposures") at age "*x*" last birthday (i.e. attained age as at the last birthday) is defined as the amount of time for which a beneficiary was exposed to the risk of death at age "*x*" during that year. Specifically, exposures during a calendar year are measured as follows:

- For beneficiaries in pay who are age "*x*" on 1 January of a calendar year, life-years of exposures at age "*x*" are measured from January 1st to the earliest of a beneficiary's time of death or time they reach age "*x+1*".
- For beneficiaries in pay who are age "*x-1*" on 1 January of a calendar year, life-years of exposures at age "*x*" are measured from the time a beneficiary reaches age "*x*" to the earlier of the beneficiary's time of death or the end of the calendar year.
- For new beneficiaries who come into pay at age "*x*" during a given calendar year, life-years of exposures at age "*x*" are measured from the time an individual becomes a beneficiary to the earlier of the beneficiary's time of death, time they reach age "*x+1*", or the end of the calendar year.
- For new beneficiaries who come into pay at age "*x-1*" during a given calendar year, life-years of exposures at age "*x*" are measured from the time the new beneficiary reaches age "*x*" to the earlier of the beneficiary's time of death or the end of the calendar year.

Throughout this study, the terms "OAS" and "OAS program" are used interchangeably to refer to the OAS program. Also, all life expectancies presented in this study refer to period life expectancies (i.e., without assumed future mortality improvements).

1. The level of income used to determine the level of GIS and Allowance entitlements as defined under the *Old Age Security Act* excludes any benefits received from the OAS program, employment income and self-employment income up to $10,000 since July 2020, and other amounts.

2.2 Methodology used for Calculating Mortality Rates

This section provides a general overview of the methodology used in the development of the mortality rates of OAS beneficiaries over the experience periods running from 1 January 1999 to 31 December 2019.

The graduated OAS beneficiary mortality rates are derived using the following two-step process:

2.2.1 Crude Mortality Rates

For all beneficiary subclasses, the crude mortality rate for a given calendar year, age "*x*", and sex is defined as the probability that a person of age "*x*" will die between ages "*x*" and "*x+1*" during the given year. Crude mortality rates are usually calculated by simply dividing the relevant number of deaths by the number of life-years of exposures (defined above) over the given year or period. For this study, annual crude mortality rates are determined using the Product-Limit Estimator (PLE) method, also known as the Kaplan-Meier Product-Limit Estimator method by using the survival rates (see Appendix B of Actuarial Study No.11). For the overall OAS program experience, the highest ages for which the crude mortality rates were judged to be statistically credible are age 97 for males and 101 for females.

2.2.2 Graduated Mortality Rates

For a given calendar year, the OAS beneficiary crude mortality rates by year, age, sex, and various other subclasses (i.e., by type of benefit, marital status, and place of birth), were graduated by age to reflect a compromise between smoothness and fit. A Whittaker-Henderson graduation method was used to produce smoothed rates up to the highest advanced age such that the trend in mortality over that age and the previous three ages was deemed to provide the best fit for convergence to the ultimate mortality rates at age 120 of 700 deaths per 1,000 males and 650 deaths per 1,000 females.

3 OAS Beneficiary Mortality

3.1 Introduction

This section presents the overall mortality of OAS beneficiaries over the period 1999 to 2019. As was done in the previous three OAS mortality studies, the OAS benefits provided through international social security agreements have been excluded from this study.

3.2 Overall Mortality Experience (1999-2019)

3.2.1 Beneficiaries

Historical data on the number of OAS beneficiaries by age and sex are presented in Table 1. As females live longer than males, in 2019, 29% of female beneficiaries were aged 80 and over compared to 23% for males. There were over 9,800 centenarians in 2019, out of which 83% were females.

Between 1999 and 2019, the number of male beneficiaries increased by 85%, from 1.6 million in 1999 to 2.9 million in 2019. Over the same period, the number of female beneficiaries increased by 63%, from 2.1 million to 3.5 million. The steeper increase in the number of male beneficiaries can be attributed to the higher mortality improvement rates for males over that period.

Table 1 OAS Beneficiaries (as at December 31st)

	Males					
	Number			Distribution		
Age Group	1999	2009	2019	1999	2009	2019
65-69	521,861	655,116	908,908	33%	32%	31%
70-74	436,295	502,918	804,298	28%	25%	28%
75-79	321,466	402,107	541,093	20%	20%	19%
80-84	174,527	270,065	345,669	11%	13%	12%
85-89	85,757	139,362	203,740	5%	7%	7%
90-94	26,153	41,698	79,804	2%	2%	3%
95-99	4,921	8,700	17,215	0%	0%	1%
100+	523	816	1,636	0%	0%	0%
Total	1,571,503	2,020,782	2,902,363	100%	100%	100%

	Females					
	Number			Distribution		
Age Group	1999	2009	2019	1999	2009	2019
65-69	562,888	698,644	992,966	27%	27%	29%
70-74	523,488	560,828	877,935	25%	22%	25%
75-79	456,891	487,385	618,097	22%	19%	18%
80-84	296,616	391,584	438,098	14%	15%	13%
85-89	181,385	266,065	304,303	9%	10%	9%
90-94	73,457	109,634	161,967	3%	4%	5%
95-99	18,879	31,943	54,230	1%	1%	2%
100+	2,839	4,562	8,211	0%	0%	0%
Total	2,116,443	2,550,645	3,455,807	100%	100%	100%

Tables 36 to 41 in the Annex show various statistics related to OAS program beneficiaries by individual age and sex.

3.2.2 Deaths

Table 2 presents the number of deaths by age group and sex. The deaths are tabulated on an age last birthday basis. Over the period 1999 to 2019, there were 2.0 million male deaths and 2.1 million

female deaths. Of the 233,370 deaths in 2019, there were 4,092 classified as centenarians (82% being females). The median age at death of males increased by 3.0 years, from 78.8 years in 1999 to 81.8 years in 2019, while for females it increased by 2.9 years, from 83.3 to 86.2 years over the same period. Female deaths are distributed more toward the older ages compared to males, because of females' greater longevity.

Table 2 OAS Beneficiary Deaths (1999-2019)

	Males						
	Number				Distribution		
Age Group	1999-2019	1999	2009	2019	1999	2009	2019
65-69	234,868	11,541	10,602	13,187	13.8%	11.8%	11.6%
70-74	302,177	15,685	12,701	17,319	18.7%	14.2%	15.2%
75-79	366,639	18,546	17,369	18,640	22.1%	19.4%	16.4%
80-84	405,639	16,820	19,714	20,783	20.1%	22.0%	18.3%
85-89	360,497	13,192	17,245	22,290	15.7%	19.3%	19.6%
90-94	208,526	6,141	8,835	15,360	7.3%	9.9%	13.5%
95-99	63,435	1,714	2,718	5,478	2.0%	3.0%	4.8%
100+	9,298	217	382	754	0.3%	0.4%	0.7%
Total	1,951,079	83,856	89,566	113,811	100.0%	100.0%	100.0%
Median Age	80.8	78.8	80.9	81.8			

	Females						
	Number				Distribution		
Age Group	1999-2019	1999	2009	2019	1999	2009	2019
65-69	154,346	6,899	6,751	8,896	7.8%	6.8%	7.4%
70-74	212,554	10,504	9,114	12,307	11.8%	9.2%	10.3%
75-79	291,863	15,236	13,299	14,537	17.2%	13.4%	12.2%
80-84	395,191	17,560	19,279	18,600	19.8%	19.5%	15.6%
85-89	465,628	18,816	23,226	24,029	21.2%	23.5%	20.1%
90-94	388,681	13,033	17,179	24,220	14.7%	17.4%	20.3%
95-99	182,050	5,357	8,247	13,632	6.0%	8.3%	11.4%
100+	43,322	1,256	1,814	3,338	1.4%	1.8%	2.8%
Total	2,133,635	88,661	98,909	119,559	100.0%	100.0%	100.0%
Median Age	85.0	83.3	85.1	86.2			

Chart 1 shows the change in the distribution of deaths by age and sex for 1999, 2009 and 2019. It clearly illustrates that the median age at death for both males and females has increased over time as the distribution has shifted to the right. In 2019, the highest number of deaths occurred at age 88 for males and at age 90 for females, this compares to age 78 for males and age 85 for females in 1999.

Chart 1 Distribution of OAS Beneficiary Deaths (1999, 2009 and 2019)

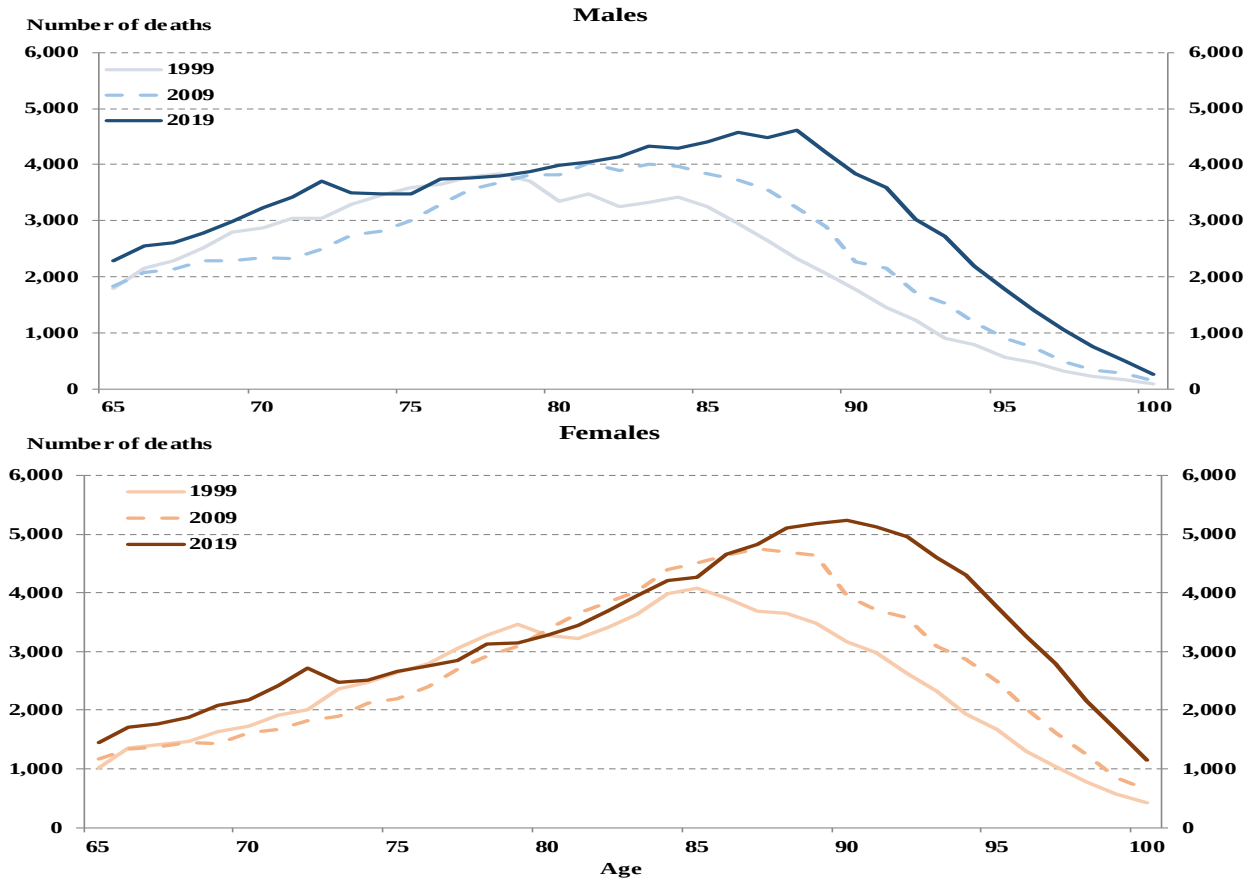


Table 3 shows, by age group and sex, a comparison of the number of deaths from the OAS database with the number of deaths reported by Statistics Canada (from the official Vital Statistics for Canada) over the period 2015 to 2019. For ages 65 to 69, the lower number of OAS deaths compared to the Vital Statistics may be explained by recipient rates for OAS benefits being less than 100%. This could be due to the fact that a portion of the population has not yet applied for OAS benefits by age 70 because of either not being eligible or opting to delay take-up of their pension in order to receive an actuarial adjustment or accumulate more years of residence and hence receive a higher pension. For ages 70 and above, the number of deaths from Vital Statistics is lower than that from the OAS database. The larger number of deaths as reported from the OAS program when compared to Vital Statistics is due to the fact that Vital Statistics exclude Canadians who die outside Canada while the OAS program includes them.

Table 3 Comparison of OAS Beneficiary Deaths with Vital Statistics Deaths (2015-2019)

	Males			Females		
Age Group	OAS	Vital Statistics(1)	Ratio OAS to Vital Statistics	OAS	Vital Statistics(1)	Ratio OAS to Vital Statistics
65-69	65,264	66,294	0.984	43,932	44,761	0.981
70-74	79,461	78,058	1.018	57,387	56,652	1.013
75-79	88,160	86,234	1.022	68,994	68,148	1.012
80-84	102,756	100,769	1.020	92,715	91,287	1.016
85-89	107,559	104,955	1.025	120,458	118,264	1.019
90+	98,368	95,226	1.033	195,200	190,449	1.025
Total	541,568	531,536	1.019	578,686	569,561	1.016

(1) The number of deaths for the period 2015 to 2019 is from official Vital Statistics from Statistics Canada, Deaths database (Table: 13-10-0709-01 formerly CANSIM 102-0503)).

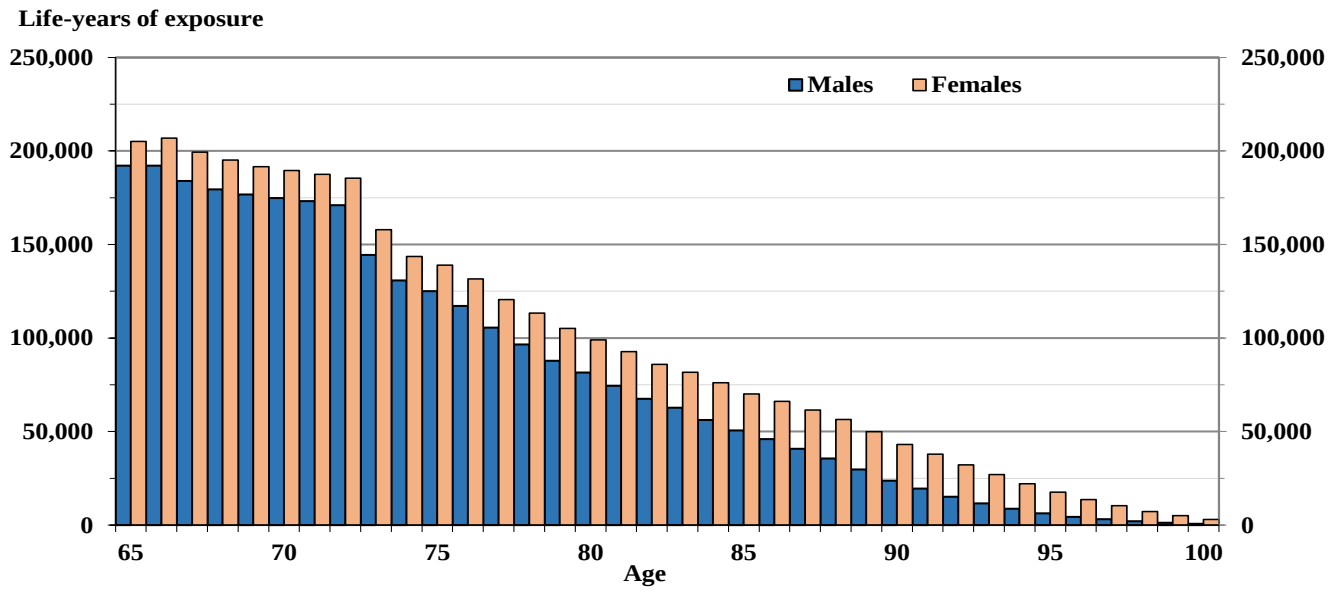
3.2.3 Exposures

Consistent with the number of beneficiaries shown in Table 1, Table 4 shows that as females live longer than males, female life-years of exposures are on average distributed more toward the advanced ages. Chart 2 shows that females have higher exposures than males at every age because of females' greater longevity.

Table 4 OAS Beneficiary Exposures (2019)

	Exposures			Distribution		
Age Group	Males	Females	Both Sexes	Males	Females	Both Sexes
65-69	924,379	998,005	1,922,384	32.0%	29.1%	30.4%
70-74	794,014	863,846	1,657,860	27.4%	25.2%	26.2%
75-79	532,144	609,320	1,141,463	18.4%	17.7%	18.0%
80-84	342,409	435,381	777,790	11.8%	12.7%	12.3%
85-89	202,631	304,147	506,778	7.0%	8.9%	8.0%
90-94	78,744	162,266	241,010	2.7%	4.7%	3.8%
95-99	16,981	53,654	70,634	0.6%	1.6%	1.1%
100+	1,609	8,131	9,739	0.1%	0.2%	0.2%
Total	2,892,910	3,434,749	6,327,658	100.0%	100.0%	100.0%

Chart 2 OAS Beneficiary Exposures (2019)



3.2.4.1 OAS Beneficiary Crude Mortality Rates by Age and Sex

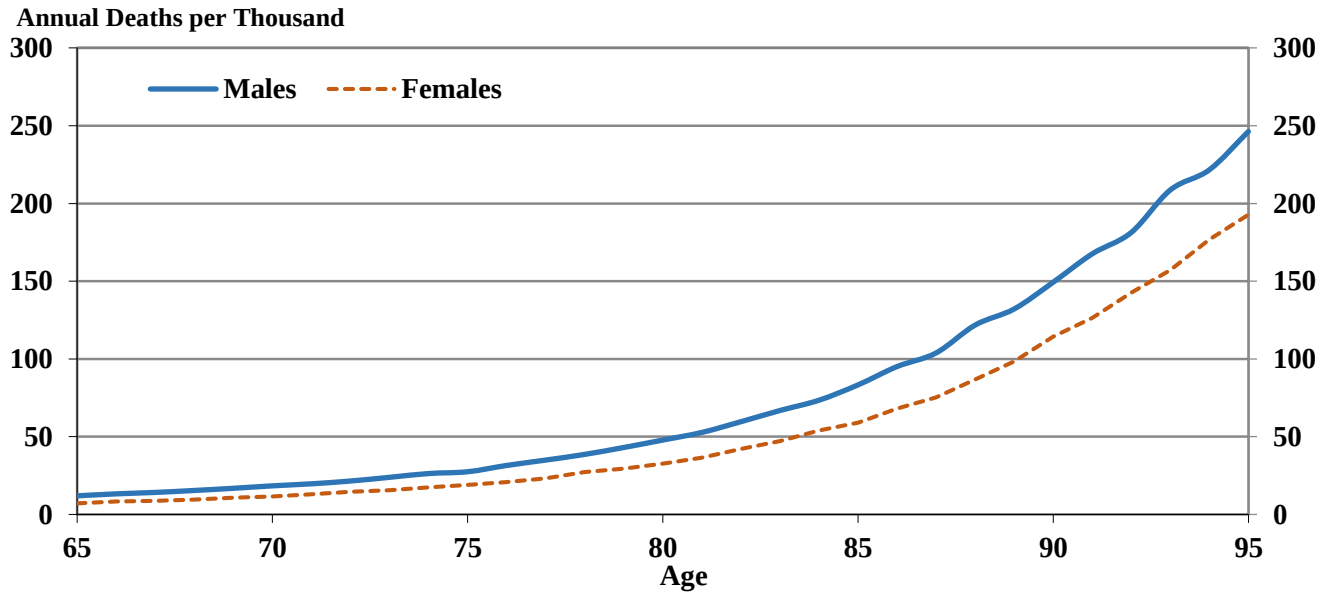
The OAS program beneficiary crude mortality rates for the year 2019 by age and sex are presented in Table 5 and Chart 3. Males experience a higher level of mortality than females at all ages.

Table 5 OAS Beneficiary Crude Mortality Rates* (2019)

Age	Annual Deaths per Thousand		Ratio
	Males	Females	Females to Males
65	11.9	7.1	0.60
70	18.3	11.4	0.63
75	27.4	18.9	0.69
80	47.7	32.6	0.68
85	83.2	59.0	0.71
90	149.3	114.2	0.77
95	246.2	192.8	0.78
100	332.1	312.5	0.94

*The highest ages for which the crude mortality rates were judged to be statistically credible are age 97 for males and 101 for females.

Chart 3 OAS Beneficiary Crude Mortality Rates (2019)



3.2.4.2 OAS Beneficiary Graduated Mortality Rates by Age and Sex (2019)

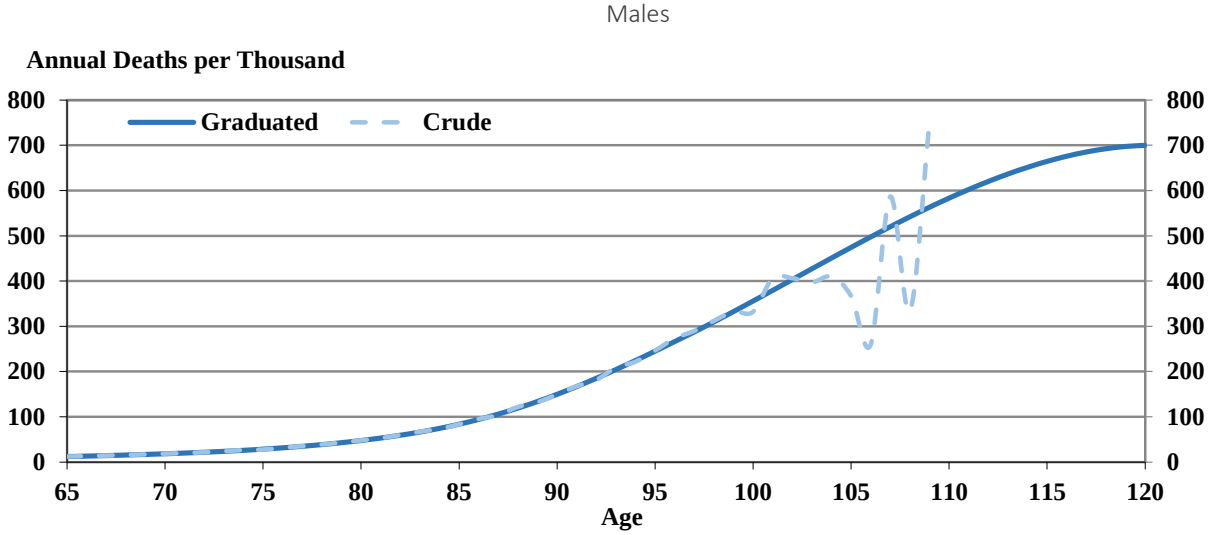
The graduated and extended mortality rates by age and sex and corresponding ratios of female to male mortality rates for the year 2019 are presented in Table 6, and a comparison of the graduated and crude mortality rates for both sexes is shown in Chart 4.

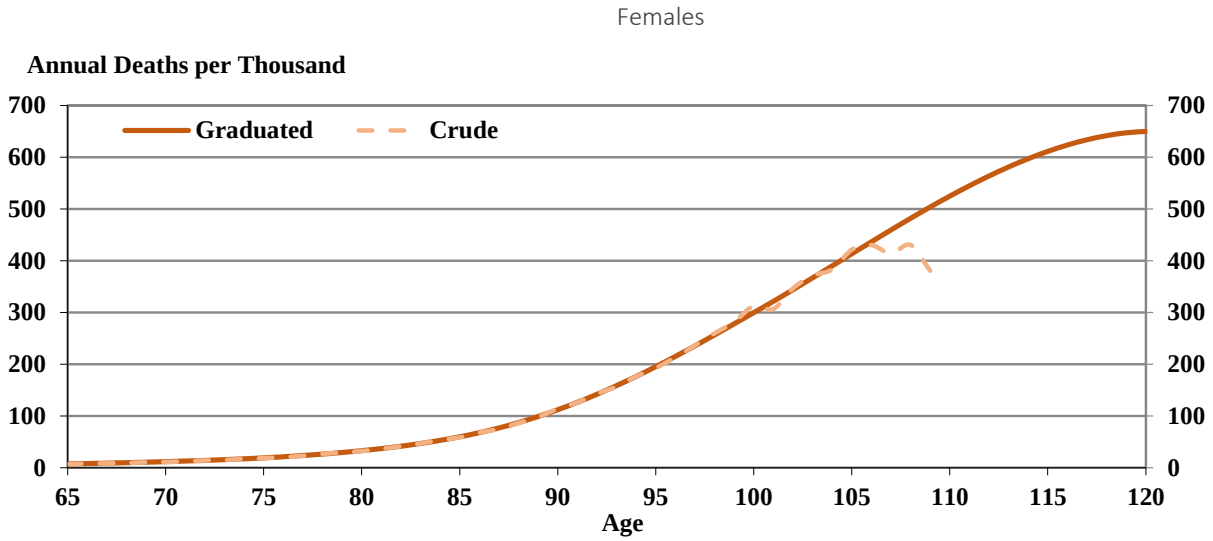
Table 6 OAS Beneficiary Graduated Mortality Rates (2019)

Age	Annual Deaths per Thousand		Ratio
	Males	Females	Females to Males
65	12.0	7.2	0.61
70	18.1	11.7	0.65
75	28.4	19.0	0.67
80	47.5	33.0	0.69
85	83.6	59.8	0.72
90	149.7	112.0	0.75
95	245.0	195.4	0.80
100	355.8	299.7	0.84
105	474.4	413.3	0.87
110	583.3	524.8	0.90
115	664.6	611.3	0.92
120	700.0	650.0	0.93

Although male OAS beneficiaries experience higher mortality than female beneficiaries, the relative gap between the male and female graduated rates declines significantly with age, with mortality between the sexes converging at the older ages. At ages 70 to 80, female OAS beneficiaries experience mortality rates that are about two thirds the rates for males. By age 95, female mortality rates are 80% of male rates.

Chart 4 OAS Beneficiary Crude* and Graduated Mortality Rates (2019)





*The highest ages for which the crude mortality rates were judged to be statistically credible are age 97 for males and 101 for females

3.3 Comparison of OAS Beneficiary and Population Mortality (2019)

Since OAS beneficiaries represent a substantial portion of the Canadian population aged 65 and over, the mortality rates of OAS beneficiaries were compared to those of the population of Canada for the year 2019. The year 2019 was the most current year for which data on population mortality from Statistics Canada Life Tables (CLT) were available at the time of this study. For comparison purposes, mortality rates for year 2019 from the Canada Life Tables were extended to age 120.

Table 7 and Chart 5 show the ratios of OAS beneficiary to population mortality rates by age and sex for the year 2019. For both sexes in 2019, OAS beneficiary mortality rates are higher than for the population at most ages. In 2019, the mortality rates of male and female OAS beneficiaries at age 65 are 11% and 5% higher, respectively, relative to corresponding mortality rates in the Canadian population. An increase in the ratios at ages 65 to 69 can be observed since 2013. These higher ratios may be the result of the implementation of the OAS deferral provision which took effect in 2012.Those more apt to defer are those with better financial situations (i.e. married and not eligible for the GIS). This results in a population of beneficiaries at ages 65 to 69 that is more skewed towards singles and those receiving GIS, both groups having higher mortality than the general population

Between ages 75 and 85, the mortality rates of OAS beneficiaries are about at the same level as those of the Canadian population. Beyond age 85, the OAS beneficiary mortality rates are slightly higher that the general population rates. At age 100, the mortality rates of male and female OAS beneficiaries is 5% and 2% higher, respectively, than the corresponding rates of the Canadian population.

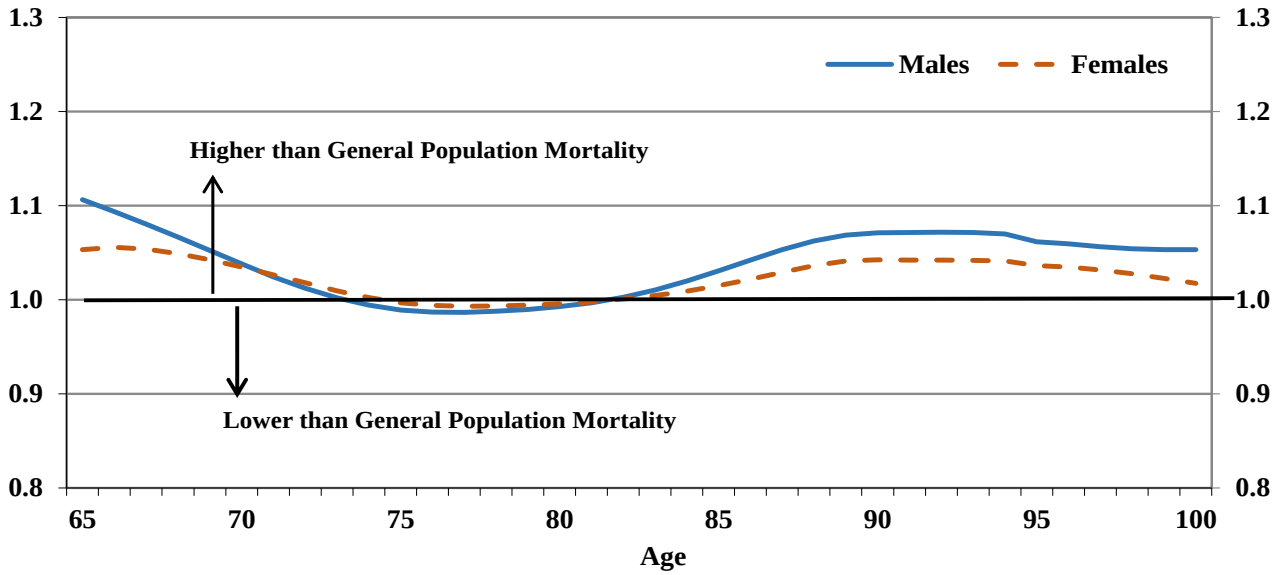
An important reason that may explain the difference between the OAS and population mortality rates is the differences between the population census survey data used in constructing Canada Life Tables and the OAS administrative data used for this study.

Table 7 OAS Beneficiary and Population Mortality Rates and Ratios (2019)

	Males			Females		
	Annual Deaths Per Thousand		Ratio OAS to Vital Statistics	Annual Deaths Per Thousand		Ratio OAS to Vital Statistics
Age	OAS	Population[1]		OAS	Population[1]	
65	12.0	10.8	1.11	7.2	6.9	1.05
70	18.1	17.5	1.04	11.7	11.3	1.03
75	28.4	28.7	0.99	19.0	19.1	1.00
80	47.5	47.8	0.99	33.0	33.1	1.00
85	83.6	81.1	1.03	59.8	58.9	1.01
90	149.7	139.7	1.07	112.0	107.5	1.04
95	245.0	230.9	1.06	195.4	188.5	1.04
100	355.8	337.8	1.05	299.7	294.5	1.02

(1) Canada Population mortality rates are based on graduated rates from the Statistics Canada's 2019 CLT Tables. OCA calculations.

Chart 5 OAS Beneficiary to Population Mortality Ratios (2019)



3.4 Life Expectancies

3.4.1 Evolution of OAS Beneficiary Life Expectancies

Table 8 shows life expectancies for OAS beneficiaries for the year 2019. The gap in life expectancies between female and male OAS beneficiaries reduces as age increases. At age 65, the gap between female and male life expectancies is 2.8 years, while the difference reduces to 0.9 of a year at age 90.

Table 8 OAS Beneficiary Life Expectancies (2019)

Age	Males	Females	Difference (Females – Males)
65	19.4	22.2	2.8
70	15.7	18.1	2.4
75	12.2	14.3	2.1
80	9.0	10.7	1.7
85	6.4	7.7	1.3
90	4.3	5.3	1.0

Table 9 shows, for both sexes, the evolution over the period 1999 to 2019 of life expectancies at age 65 of OAS beneficiaries and the general population. In general, OAS beneficiaries experience slightly

higher mortality than the general population. In 2019, life expectancies at age 65 for the Canadian population are 19.6 years for males and 22.4 years for females. These population life expectancies are 0.2 of a year higher than the life expectancies of OAS beneficiaries at age 65, which are 19.4 years for males and 22.2 years for females. As discussed above, these differences may be explained by differences in data used.

Table 9 OAS Beneficiary and Population Life Expectancies at Age 65 (1999-2019)

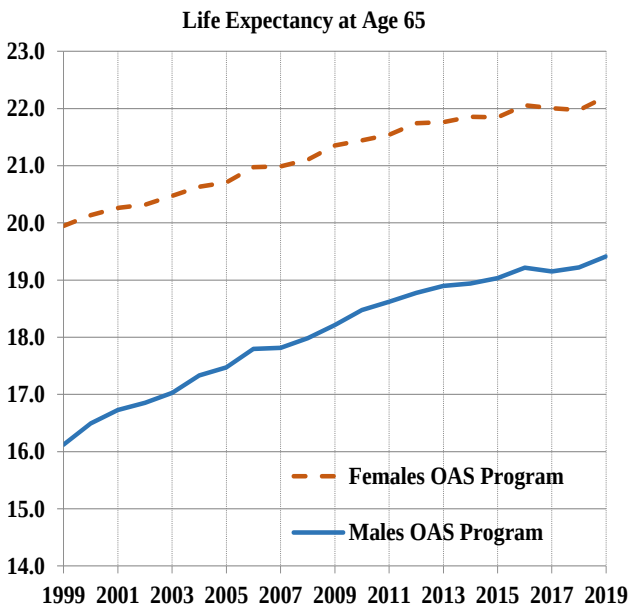
	Life Expectancy at Age 65						
	Males			Females			
Year	OAS	Population	Difference (Pop - OAS)	OAS	Population	Difference (Pop - OAS)	Difference OAS Females - Males
1999	16.1	16.4	0.3	19.9	20.1	0.2	3.8
2000	16.5	16.7	0.2	20.1	20.2	0.1	3.6
2001	16.7	17.0	0.3	20.3	20.4	0.1	3.6
2002	16.9	17.1	0.2	20.3	20.4	0.1	3.4
2003	17.0	17.3	0.3	20.5	20.6	0.1	3.5
2004	17.3	17.5	0.2	20.6	20.7	0.1	3.3
2005	17.5	17.7	0.2	20.7	20.8	0.1	3.2
2006	17.8	18.0	0.2	21.0	21.1	0.1	3.2
2007	17.8	18.0	0.2	21.0	21.1	0.1	3.2
2008	18.0	18.1	0.1	21.1	21.3	0.2	3.1
2009	18.2	18.4	0.2	21.4	21.5	0.1	3.2
2010	18.5	18.7	0.2	21.4	21.6	0.2	2.9
2011	18.6	18.8	0.2	21.5	21.8	0.3	2.9
2012	18.8	19.0	0.2	21.7	22.0	0.3	2.9
2013	18.9	19.1	0.2	21.8	21.9	0.1	2.9
2014	18.9	19.1	0.2	21.9	22.0	0.1	3.0
2015	19.0	19.2	0.2	21.8	21.9	0.1	2.8
2016	19.2	19.4	0.2	22.1	22.2	0.1	2.9
2017	19.1	19.4	0.3	22.0	22.1	0.1	2.9
2018	19.2	19.5	0.3	22.0	22.1	0.1	2.8
2019	19.4	19.6	0.2	22.2	22.4	0.2	2.8

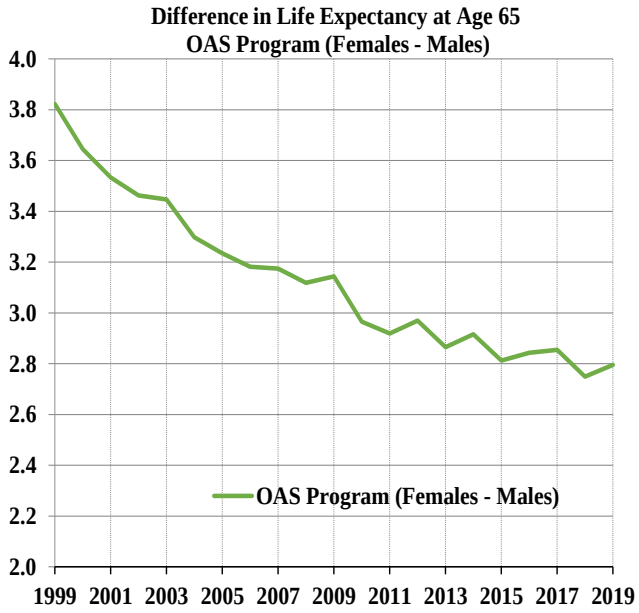
The evolution of life expectancies of OAS beneficiaries for both sexes at age 65 from 1999 to 2019 is also shown in Chart 6. In 2019, the life expectancies at age 65 for OAS beneficiaries are 19.4 years for males and 22.2 years for females. These are 3.3 years and 2.3 years, respectively, higher than the corresponding life expectancies observed in 1999. However, the pace of increase in life expectancy at age 65 has slowed down over the last decade. Between 1999 and 2009, the average overall increase, for both sexes combined, was 2 months per year (from 18.0 to 19.8 years) which compares to a lower average increase over the most recent period 2009 to 2019 of 1 month per year (from 19.8 to 20.8 years). This recent slowdown in mortality improvements[1] is analyzed further in Section VII of this study.

The gap in life expectancies between females and males has decreased from 3.8 years in 1999 to 2.8 years in 2019, with most of the decrease attributed to years prior to 2009 when males have experienced much higher mortality improvements than females.

[1] This recent slowdown in mortality improvements has also been observed in other countries. (See: Continuous Mortality Investigation Projections Committee, 2015, Raleigh, 2019, and Zhang et al., 2019).

Chart 6 Evolution of OAS Beneficiary Life Expectancies at Age 65 (1999-2019)





4 OAS Beneficiary Mortality by Type of Benefit

4.1 Introduction

This section presents the results of analysis on the mortality of OAS program beneficiaries by type of benefit defined by whether an OAS pensioner receives or not the income-tested GIS benefit.

4.2 Mortality Experience by Type of Benefit (2019)

4.2.1 Beneficiaries by Type of Benefit

The number of beneficiaries by age, sex, and type of benefit received in 2019 is presented in Table 10. In aggregate for all age groups, in 2019, the proportion of male beneficiaries receiving the GIS was 29% compared to 36% of female beneficiaries. This is consistent with the fact that females have on average lower income than males. The differential in the proportion of male and female beneficiaries receiving the GIS increases at the older ages. For the age group 65 to 69, the proportion of males with the GIS is 25% compared to 27% for females, while for the age group 90 to 94, the corresponding proportions are 35% and 52%.

Table 10 Beneficiaries by Type of Benefit (as at December 31, 2019)

	Males			Females		
Age Group	Without GIS	With GIS	Proportion with GIS	Without GIS	With GIS	Proportion with GIS
65-69	682,829	226,079	25%	726,171	266,795	27%
70-74	580,581	223,717	28%	588,328	289,607	33%
75-79	376,406	164,687	30%	382,273	235,824	38%
80-84	228,525	117,144	34%	245,645	192,453	44%
85-89	132,478	71,262	35%	159,541	144,762	48%
90-94	51,493	28,311	35%	78,468	83,499	52%
95-99	11,034	6,181	36%	24,096	30,134	56%
100+	877	759	46%	2,781	5,430	66%
Total	2,064,223	838,140	29%	2,207,303	1,248,504	36%

Tables 42 to 48 in the Annex show various statistics related to the OAS program by individual age, sex, and type of benefit.

4.2.1.1 Deaths by Type of Benefit

Table 11 presents the number of deaths of OAS beneficiaries by age, sex, and type of benefit in 2019. In aggregate for all age groups, the proportion of males with the GIS at death is 39% compared to 52% for females. This reflects that on average females live longer than males and that an increasing proportion of females receive the GIS as age advances. For the age group 65 to 69, the proportion of males who were receiving the GIS at death is 40% compared to 43% for females. For the age group 90 to 94, the corresponding proportions are 37% and 54%.

Table 11 Deaths by Type of Benefit (2019)

	Males			Females		
Age Group	Without GIS	With GIS	Proportion with GIS	Without GIS	With GIS	Proportion with GIS
65-69	7,925	5,262	40%	5,057	3,839	43%
70-74	10,175	7,144	41%	6,556	5,751	47%
75-79	10,986	7,654	41%	7,384	7,153	49%
80-84	12,433	8,350	40%	9,151	9,449	51%
85-89	13,868	8,422	38%	11,407	12,622	53%
90-94	9,676	5,684	37%	11,198	13,022	54%
95-99	3,546	1,932	35%	5,858	7,774	57%
100+	408	346	46%	1,126	2,212	66%
Total	69,017	44,794	39%	57,737	61,822	52%

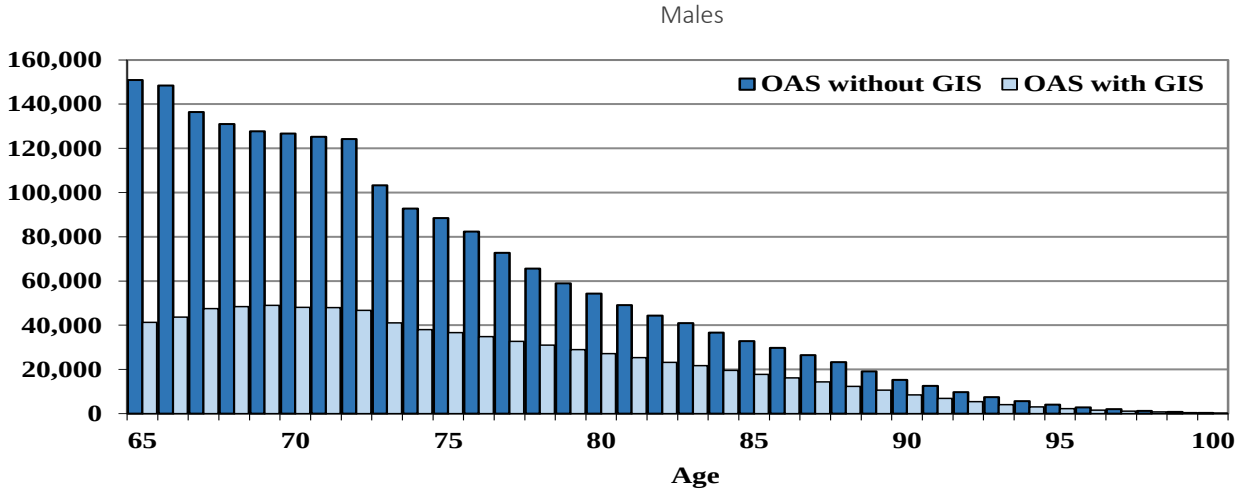
4.2.1.2 Exposures by Type of Benefit

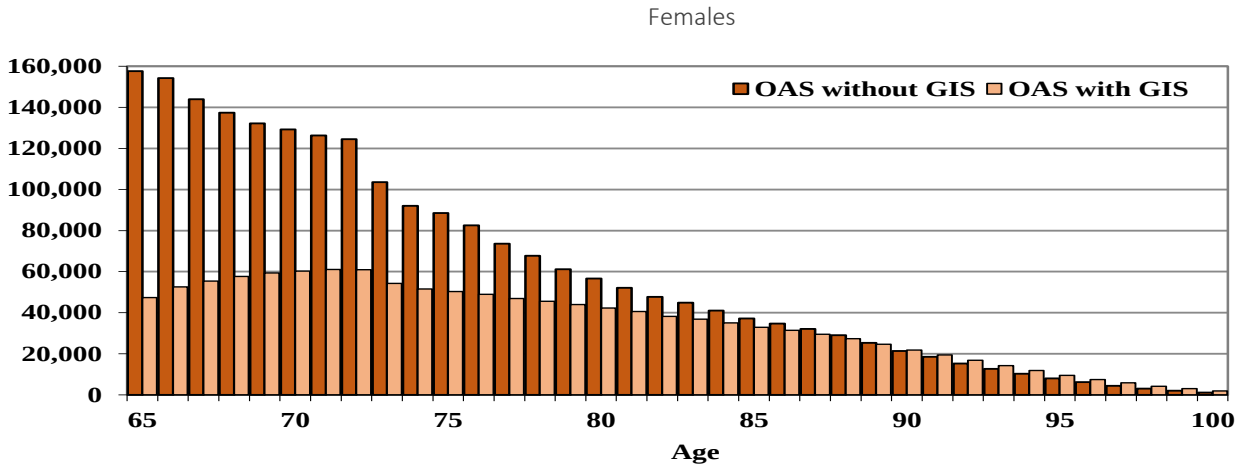
Table 12 shows that exposures by age group, sex, and type of benefit are consistent with the distribution of beneficiaries shown in Table 10. In general, female exposures exceed that of males for each type of benefit because of females' greater longevity. The age structure of the amount of exposures by type of OAS benefit received in 2019 for each sex is shown in Chart 7.

Table 12 Exposures by Type of Benefit (2019)

	Males			Females		
Age Group	Without GIS	With GIS	Proportion with GIS	Without GIS	With GIS	Proportion with GIS
65-69	694,596	229,783	25%	725,629	272,376	27%
70-74	572,163	221,851	28%	575,665	288,181	33%
75-79	368,049	164,095	31%	373,577	235,743	39%
80-84	225,411	116,998	34%	242,322	193,060	44%
85-89	131,457	71,173	35%	158,406	145,741	48%
90-94	50,757	27,988	36%	78,072	84,194	52%
95-99	10,865	6,116	36%	23,626	30,027	56%
100+	869	740	46%	2,761	5,369	66%
Total	2,054,167	838,743	29%	2,180,057	1,254,692	37%

Chart 7 Exposures by Type of Benefit (2019)





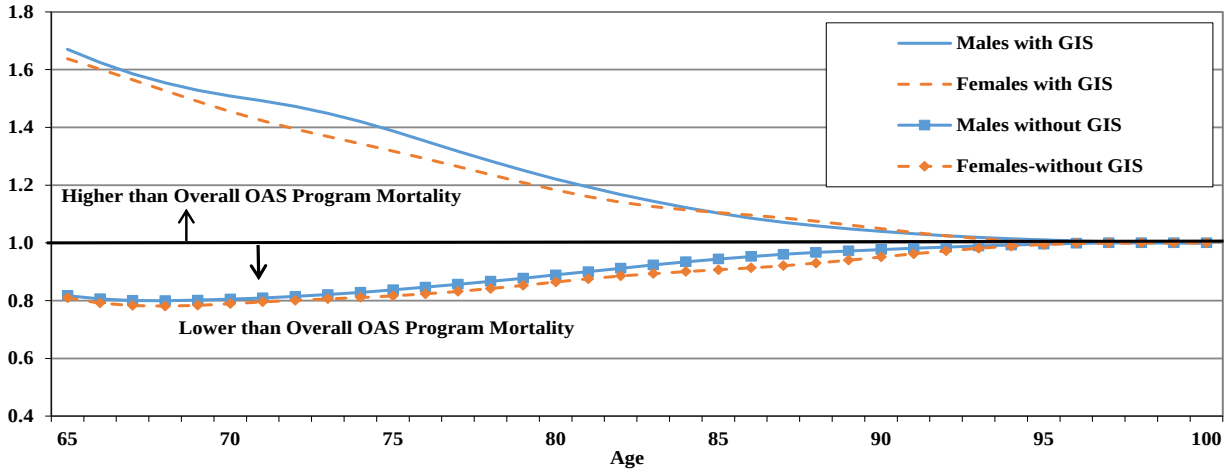
4.2.1.3 Graduated Mortality Rates by Type of Benefit

A comparison of mortality rates by type of benefit received is shown in Table 13 and Chart 8. Those beneficiaries not in receipt of the GIS experience lower mortality compared to overall OAS beneficiaries, while those who receive the GIS experience higher mortality. In 2019, GIS beneficiaries aged 65 experienced mortality that is 67% higher than the overall OAS population and about twice the level of those not receiving the GIS. In comparison, beneficiaries not receiving the GIS, aged 65, experienced mortality that is about 18% lower than the overall OAS population. In both cases however, there is convergence to the overall OAS program mortality as age increases.

Table 13 Graduated Mortality Rates and Ratios by Type of Benefit (2019)

		Males				
Age	Overall OAS (annual deaths per thousand)	Without GIS (annual deaths per thousand)	Ratio without GIS to Overall	With GIS (annual deaths per thousand)	Ratio with GIS to Overall	Ratio With to Without GIS
65	12.0	9.8	0.82	20.0	1.67	2.04
70	18.1	14.6	0.81	27.4	1.51	1.87
75	28.4	23.8	0.84	39.4	1.39	1.66
80	47.5	42.2	0.89	58.0	1.22	1.37
85	83.6	78.9	0.94	92.2	1.10	1.17
90	149.7	146.2	0.98	155.6	1.04	1.06
95	245.0	244.0	1.00	247.6	1.01	1.01
100	355.8	355.8	1.00	355.8	1.00	1.00
		Females				
Age	Overall OAS (annual deaths per thousand)	Without GIS (annual deaths per thousand)	Ratio without GIS to Overall	With GIS (annual deaths per thousand)	Ratio with GIS to Overall	Ratio With to Without GIS
65	7.2	5.9	0.81	11.9	1.64	2.02
70	11.7	9.2	0.79	17.0	1.45	1.84
75	19.0	15.6	0.82	25.1	1.32	1.61
80	33.0	28.5	0.86	39.0	1.18	1.37
85	59.8	54.2	0.91	66.0	1.10	1.22
90	112.0	106.6	0.95	117.6	1.05	1.10
95	195.4	194.2	0.99	195.9	1.00	1.01
100	299.7	299.7	1.00	300.0	1.00	1.00

Chart 8 OAS Beneficiary Mortality Ratios by Type of Benefit (2019)



4.3 Life Expectancies by Type of Benefit

4.3.1 Comparison of Life Expectancies by Age, Sex, and Type of Benefit (2019)

Table 14 shows life expectancies for beneficiaries by age, sex, and type of benefit received. In 2019, the life expectancy at age 65 for males not receiving the GIS was 20.3 years compared to 17.4 years for those receiving the GIS. The corresponding life expectancies at age 65 for females are 23.2 years and 20.7 years. For both sexes, the difference in life expectancies between those without and with the GIS reduces as age increases.

Table 14 Life Expectancies by Type of Benefit (2019)

	Males				Females			
Age	Overall OAS	Without GIS	With GIS	Difference	Overall OAS	Without GIS	With GIS	Difference
65	19.4	20.3	17.4	2.9	22.2	23.2	20.7	2.5
70	15.7	16.4	14.2	2.2	18.1	18.9	17.0	1.9
75	12.2	12.7	11.2	1.5	14.3	14.9	13.5	1.4
80	9.0	9.3	8.5	0.8	10.7	11.1	10.3	0.8
85	6.4	6.5	6.2	0.3	7.7	7.9	7.5	0.4
90	4.3	4.4	4.2	0.2	5.3	5.3	5.2	0.1

4.3.2 Evolution of Life Expectancies by Type of Benefit

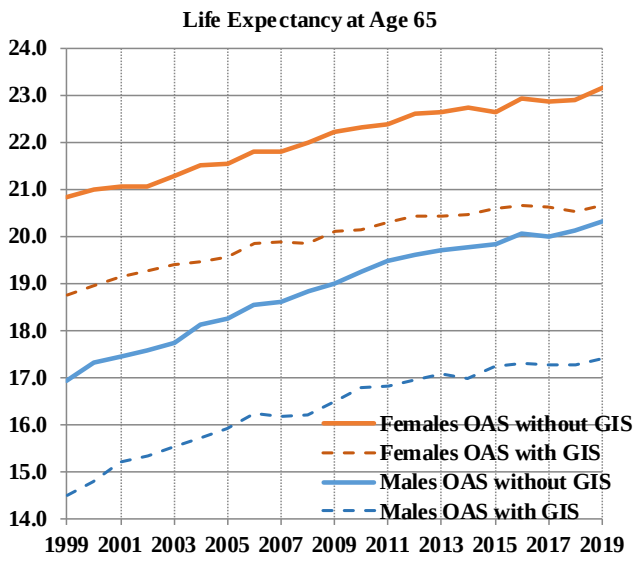
Table 15 and Chart 9 show the evolution of life expectancies at age 65 by type of benefit over the period 1999 to 2019. Over the period, low-income male beneficiaries (those receiving the GIS) have seen their life expectancy increase by about 2.9 years, while those with higher-income (not receiving the GIS) saw their life expectancy increase by 3.4 years. For females, the corresponding increases in life expectancy are about 1.9 years for those receiving the GIS compared to 2.4 years for those not receiving the benefit.

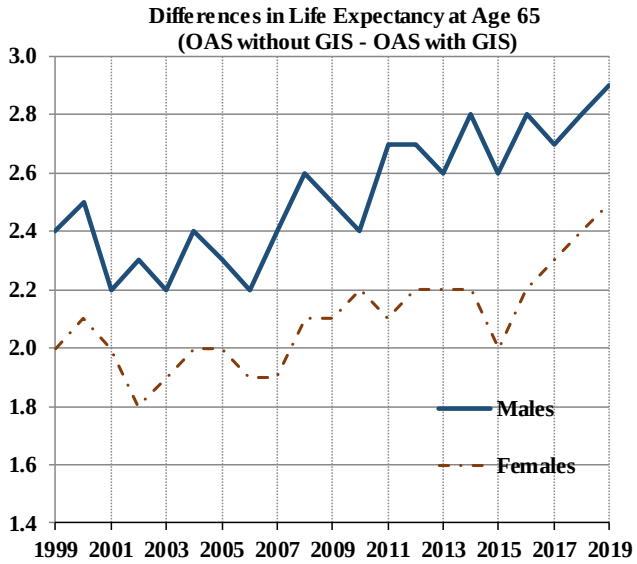
As a result, the difference in life expectancies at age 65 between beneficiaries not receiving the GIS and those in receipt of the benefit has shown an overall small, gradual increase over the period for both sexes. For males, the differential between those without and with the GIS increased overall from about 2.4 years in 1999 to 2.9 years in 2019. For females, the corresponding differential increased overall from about 2.0 to 2.5 years.

Table 15 Evolution of Life Expectancies at Age 65 by Type of Benefit (1999-2019)

	Males				Females			
Year	Overall OAS	Without GIS	With GIS	Difference (Without – With GIS)	Overall OAS	Without GIS	With GIS	Difference (Without – With GIS)
1999	16.1	16.9	14.5	2.4	19.9	20.8	18.8	2.0
2000	16.5	17.3	14.8	2.5	20.1	21.0	18.9	2.1
2001	16.7	17.4	15.2	2.2	20.3	21.1	19.1	2.0
2002	16.9	17.6	15.3	2.3	20.3	21.1	19.3	1.8
2003	17.0	17.7	15.5	2.2	20.5	21.3	19.4	1.9
2004	17.3	18.1	15.7	2.4	20.6	21.5	19.5	2.0
2005	17.5	18.2	15.9	2.3	20.7	21.6	19.6	2.0
2006	17.8	18.5	16.3	2.2	21.0	21.8	19.9	1.9
2007	17.8	18.6	16.2	2.4	21.0	21.8	19.9	1.9
2008	18.0	18.8	16.2	2.6	21.1	22.0	19.9	2.1
2009	18.2	19.0	16.5	2.5	21.4	22.2	20.1	2.1
2010	18.5	19.2	16.8	2.4	21.4	22.3	20.1	2.2
2011	18.6	19.5	16.8	2.7	21.5	22.4	20.3	2.1
2012	18.8	19.6	16.9	2.7	21.7	22.6	20.4	2.2
2013	18.9	19.7	17.1	2.6	21.8	22.6	20.4	2.2
2014	18.9	19.8	17.0	2.8	21.9	22.7	20.5	2.2
2015	19.0	19.8	17.2	2.6	21.8	22.6	20.6	2.0
2016	19.2	20.1	17.3	2.8	22.1	22.9	20.7	2.2
2017	19.1	20.0	17.3	2.7	22.0	22.9	20.6	2.3
2018	19.2	20.1	17.3	2.8	22.0	22.9	20.5	2.4
2019	19.4	20.3	17.4	2.9	22.2	23.2	20.7	2.5

Chart 9 Evolution of Life Expectancies at Age 65 by Type of Benefit (1999-2019)





5 OAS Beneficiary Mortality by Marital Status and Type of Benefit

5.1 Introduction

This section presents the results of analysis on the mortality of OAS program beneficiaries by marital status and type of benefit.

5.2 Mortality Experience by Marital Status and Type of Benefit for Year 2019

5.2.1 Beneficiaries by Marital Status and Type of Benefit

The number of beneficiaries by age, sex, marital status, and type of benefit in 2019 is presented in Table 16. In aggregate for all age groups, the proportion of male beneficiaries without the GIS who are married is 77% compared to 56% for those with GIS benefits. Overall, the proportion of female beneficiaries without the GIS who are married is 59% compared to 30% for those with GIS benefits.

For all age groups and both sexes, those with the GIS are more likely to be single than those without the GIS, especially at the younger ages. As well, for all age groups and both benefit types, females are more likely to be single compared to males, especially at the older ages due to females' greater longevity.

Table 16 Beneficiaries by Marital Status and Type of Benefit (as at December 31st 2019)

	Males									
	Overall OAS		Without GIS				With GIS			
Age Group	Married	Single	Married	Single	%Married	%Single	Married	Single	%Married	%Single
65-69	645,595	263,313	530,204	152,625	78%	22%	115,391	110,688	51%	49%
70-74	588,650	215,648	464,227	116,354	80%	20%	124,423	99,294	56%	44%
75-79	395,828	145,265	297,648	78,758	79%	21%	98,180	66,507	60%	40%
80-84	242,807	102,862	171,052	57,473	75%	25%	71,755	45,389	61%	39%
85-89	127,986	75,754	87,176	45,302	66%	34%	40,810	30,452	57%	43%
90-94	40,199	39,605	26,661	24,832	52%	48%	13,538	14,773	48%	52%
95-99	6,122	11,093	3,989	7,045	36%	64%	2,133	4,048	35%	65%
100+	362	1,274	204	673	23%	77%	158	601	21%	79%
Total	2,047,549	854,814	1,581,161	483,062	77%	23%	466,388	371,752	56%	44%
	Females									
	Overall OAS		Without GIS				With GIS			
Age Group	Married	Single	Married	Single	%Married	%Single	Married	Single	%Married	%Single
65-69	622,085	370,881	512,380	213,791	71%	29%	109,705	157,090	41%	59%
70-74	507,407	370,528	395,112	193,216	67%	33%	112,295	177,312	39%	61%
75-79	304,267	313,830	224,904	157,369	59%	41%	79,363	156,461	34%	66%
80-84	161,442	276,656	112,468	133,177	46%	54%	48,974	143,479	25%	75%
85-89	68,518	235,785	46,777	112,764	29%	71%	21,741	123,021	15%	85%
90-94	17,080	144,887	11,593	66,875	15%	85%	5,487	78,012	7%	93%
95-99	2,111	52,119	1,489	22,607	6%	94%	622	29,512	2%	98%
100+	98	8,113	70	2,711	3%	97%	28	5,402	1%	99%
Total	1,683,008	1,772,799	1,304,793	902,510	59%	41%	378,215	870,289	30%	70%

Tables 49 to 64 in the Annex show various statistics related to the OAS program by individual age, sex, marital status, and type of benefit.

5.2.2 Deaths by Marital Status and Type of Benefit

Table 17 shows that as females live longer than males, the probability of being single at death is higher for females than males. There is also variation by age group, marital status, and type of benefit as to being single at death. For example, for the age group 85 to 89, 41% of males without the GIS were single at death compared to 51% of those in receipt of the GIS. For females in the same age group, 77% without the GIS were single at death, compared to 88% of those with the GIS.

Table 17 Deaths by Marital Status and Type of Benefit (2019)

	Males									
	Overall OAS		Without GIS				With GIS			
Age Group	Married	Single	Married	Single	%Married	%Single	Married	Single	%Married	%Single
65-69	6,695	6,492	5,058	2,867	64%	36%	1,637	3,625	31%	69%
70-74	9,870	7,449	7,106	3,069	70%	30%	2,764	4,380	39%	61%
75-79	11,255	7,385	7,609	3,377	69%	31%	3,646	4,008	48%	52%
80-84	12,690	8,093	8,367	4,066	67%	33%	4,323	4,027	52%	48%
85-89	12,283	10,007	8,174	5,694	59%	41%	4,109	4,313	49%	51%
90-94	6,832	8,528	4,424	5,252	46%	54%	2,408	3,276	42%	58%
95-99	1,826	3,652	1,191	2,355	34%	66%	635	1,297	33%	67%
100+	163	591	95	313	23%	77%	68	278	20%	80%
Total	61,614	52,197	42,024	26,993	61%	39%	19,590	25,204	44%	56%

	Females									
	Overall OAS		Without GIS				With GIS			
Age Group	Married	Single	Married	Single	%Married	%Single	Married	Single	%Married	%Single
65-69	4,169	4,727	3,064	1,993	61%	39%	1,105	2,734	29%	71%
70-74	5,437	6,870	3,853	2,703	59%	41%	1,584	4,167	28%	72%
75-79	5,465	9,072	3,632	3,752	49%	51%	1,833	5,320	26%	74%
80-84	5,311	13,289	3,347	5,804	37%	63%	1,964	7,485	21%	79%
85-89	4,229	19,800	2,679	8,728	23%	77%	1,550	11,072	12%	88%
90-94	2,097	22,123	1,381	9,817	12%	88%	716	12,306	5%	95%
95-99	464	13,168	301	5,557	5%	95%	163	7,611	2%	98%
100+	24	3,314	20	1,106	2%	98%	4	2,208	0%	100%
Total	27,196	92,363	18,277	39,460	32%	68%	8,919	52,903	14%	86%

5.2.3 Exposures by Marital Status and Type of Benefit

Table 18 shows the distributions of the exposures for the year 2019, by age group, sex, marital status, and type of benefit. Again, as females generally live longer than males, the proportion of exposures related to single rather than married beneficiaries is higher for females than for males for both benefit types, especially at the advanced ages. The distributions in Table 18 are consistent with those in Table 16, and as such, the other observations made earlier for Table 16 apply here as well.

Table 18 Exposures by Marital Status and Type of Benefit (2019)

	Males									
	Overall OAS		Without GIS				With GIS			
Age Group	Married	Single	Married	Single	%Married	%Single	Married	Single	%Married	%Single
65-69	657,959	266,421	540,429	154,168	78%	22%	117,530	112,253	51%	49%
70-74	580,260	213,754	456,924	115,240	80%	20%	123,337	98,514	56%	44%
75-79	387,636	144,508	289,712	78,336	79%	21%	97,923	66,172	60%	40%
80-84	238,240	104,168	166,973	58,438	74%	26%	71,267	45,731	61%	39%
85-89	124,871	77,760	84,855	46,603	65%	35%	40,016	31,157	56%	44%
90-94	38,473	40,272	25,432	25,324	50%	50%	13,040	14,947	47%	53%
95-99	5,870	11,110	3,826	7,039	35%	65%	2,044	4,071	33%	67%
100+	344	1,265	195	673	23%	77%	148	592	20%	80%
Total	2,033,652	859,258	1,568,346	485,821	76%	24%	465,306	373,437	55%	45%
	Females									
	Overall OAS		Without GIS				With GIS			
Age Group	Married	Single	Married	Single	%Married	%Single	Married	Single	%Married	%Single
65-69	620,482	377,523	509,314	216,314	70%	30%	111,168	161,208	41%	59%
70-74	493,726	370,119	383,177	192,488	67%	33%	110,550	177,631	38%	62%
75-79	293,925	315,394	216,015	157,562	58%	42%	77,910	157,833	33%	67%
80-84	154,669	280,712	107,287	135,035	44%	56%	47,382	145,678	25%	75%
85-89	64,742	239,405	44,081	114,325	28%	72%	20,661	125,080	14%	86%
90-94	15,809	146,456	10,748	67,323	14%	86%	5,061	79,133	6%	94%
95-99	1,937	51,717	1,369	22,257	6%	94%	567	29,460	2%	98%
100+	85	8,045	60	2,701	2%	98%	25	5,344	0%	100%
Total	1,645,376	1,789,372	1,272,052	908,005	58%	42%	373,324	881,367	30%	70%

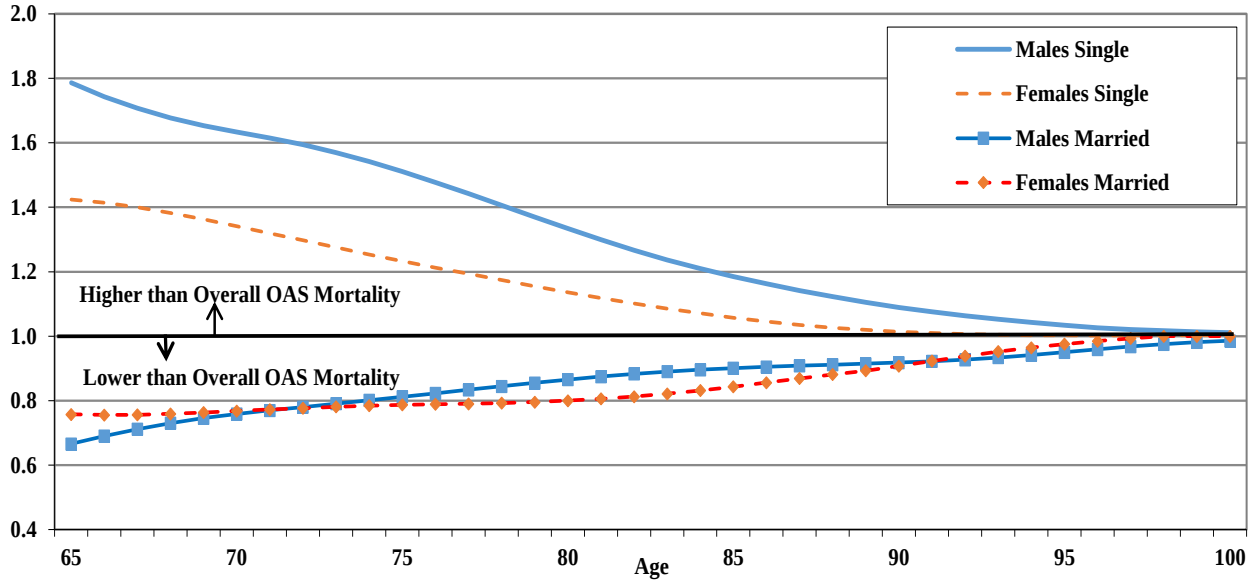
5.2.4 OAS Beneficiary Mortality by Age and Marital Status

Table 19 and Chart 10 show a comparison of mortality rates by age, sex, and marital status for year 2019. Males generally experience more of a mortality differential by marital status than females. The mortality ratio of single to married males is higher than for females at all ages. In 2019, at age 65, married males experience mortality that is 33% lower than for the overall program while it is 24% lower for females. In comparison, at age 65, male singles experience mortality that is 79% higher than for the overall program, while the corresponding percentage for females experience mortality is 42%. As a result, the ratio of single mortality to married mortality is 2.68 for males and of 1.88 for females. For both sexes, married and singles, mortality gradually converges to the overall level as age increases.

Table 19 OAS Beneficiary Graduated Mortality Rates and Ratios by Marital Status (2019)

	Males						Females					
Year	Overall OAS (annual deaths per thousand)	Married (annual deaths per thousand)	Ratio Married to Overall	Single (annual deaths per thousand)	Ratio Single to Overall	Ratio Single to Married	Overall OAS (annual deaths per thousand)	Married (annual deaths per thousand)	Ratio Married to Overall	Single (annual deaths per thousand)	Ratio Single to Overall	Ratio Single to Married
65	12.0	8.0	0.67	21.4	1.79	2.68	7.25	5.49	0.76	10.32	1.42	1.88
70	18.1	13.8	0.76	29.6	1.63	2.15	11.71	9.00	0.77	15.70	1.34	1.75
75	28.4	23.0	0.81	42.9	1.51	1.86	19.05	14.99	0.79	23.49	1.23	1.57
80	47.5	41.1	0.87	63.4	1.33	1.54	32.97	26.38	0.80	37.45	1.14	1.42
85	83.6	75.3	0.90	99.1	1.19	1.32	59.77	50.41	0.84	63.20	1.06	1.25
90	149.7	137.4	0.92	163.0	1.09	1.19	112.05	101.70	0.91	113.61	1.01	1.12
95	245.0	232.8	0.95	253.4	1.03	1.09	195.36	190.57	0.98	195.84	1.00	1.03
100	355.8	350.8	0.99	359.8	1.01	1.03	299.71	299.71	1.00	300.50	1.00	1.00

Chart 10 OAS Beneficiary Mortality Ratios by Marital Status (2019)



5.2.5 Mortality by Marital Status and Type of Benefit

Table 20 and Chart 11 show a comparison of male mortality rates by age, marital status, and type of benefit. Single males in receipt of the GIS experience the highest mortality at most ages. For example, at age 65, single male GIS beneficiaries experience mortality that is almost two and a half times more than that of the overall OAS population. Single males without the GIS experience mortality that is higher compared to married GIS beneficiaries. Married males without the GIS experience the lowest mortality except at the very advanced ages. All subgroups show convergence to overall program mortality as age increases.

However, it should be noted that people living alone at older ages include widows/ers. As shown in CPP30, CPP survivor beneficiaries have higher mortality than the general population. For example in 2019, the difference in period life expectancy at age 65 between male survivors and the general population is 1.5 years. The difference for females is 1.0 years. Therefore, the analysis of OAS mortality trends by marital status must be interpreted with caution so that the 'widow effect' is well understood and considered. Nevertheless, the life expectancy gap between single and married individuals is higher than the gap between survivors and the general population. This points to additional reasons that may

explain this difference in mortality. The lower mortality for married individuals may be related to better socio-economic situations of married individuals, and to the fact that a spouse provides physical and emotional support that has a positive impact on general health and well-being.

Table 20 Mortality Rates and Ratios by Marital Status and Type of Benefit - Males (2019)

		Without GIS					With GIS				
Year	Overall OAS (annual deaths per thousand)	Married (annual deaths per thousand)	Ratio Married to Overall	Single (annual deaths per thousand)	Ratio Single to Overall	Ratio Single to Married	Married (annual deaths per thousand)	Ratio Married to Overall	Single (annual deaths per thousand)	Ratio Single to Overall	Ratio Single to Married
65	12.0	7.6	0.64	16.6	1.39	2.18	9.9	0.83	29.4	2.46	2.96
70	18.1	12.6	0.69	22.4	1.24	1.78	18.3	1.01	37.9	2.09	2.07
75	28.4	20.8	0.73	35.1	1.24	1.69	30.3	1.07	51.8	1.83	1.71
80	47.5	38.2	0.81	55.2	1.16	1.44	48.2	1.02	73.2	1.54	1.52
85	83.6	72.9	0.87	92.1	1.10	1.26	80.4	0.96	108.9	1.30	1.35
90	149.7	135.4	0.90	158.7	1.06	1.17	141.2	0.94	169.5	1.13	1.20
95	245.0	230.8	0.94	254.1	1.04	1.10	235.4	0.96	254.4	1.04	1.08
100	355.8	348.6	0.98	368.2	1.03	1.06	355.6	1.00	358.3	1.01	1.01

Chart 11 Mortality Ratios by Marital Status, and Type of Benefit - Males (2019)

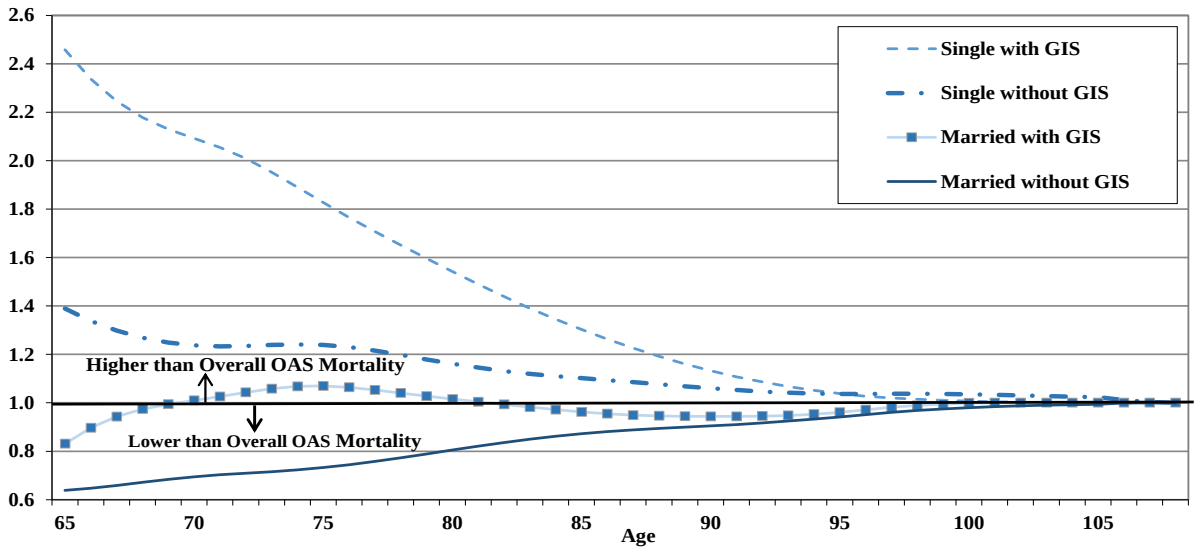


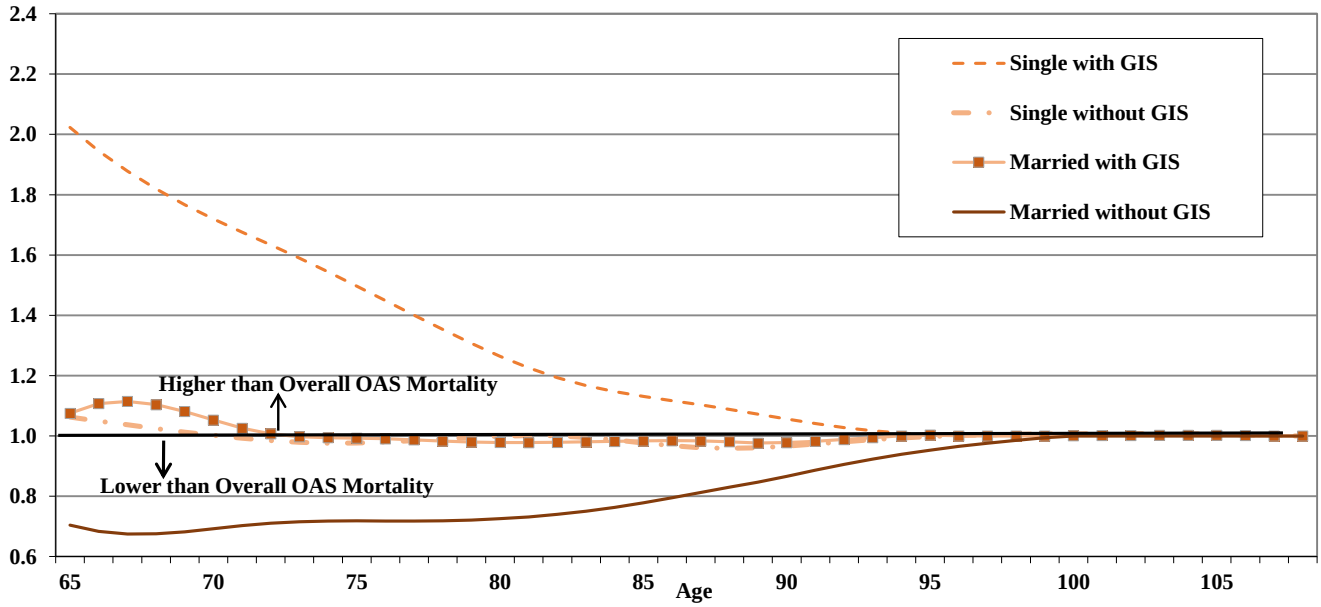
Table 21 and Chart 12 show female mortality rates by age, marital status, and type of benefit. Single female GIS beneficiaries experience the highest mortality of all female beneficiaries, except at the very advanced ages. The mortality ratio for single female GIS beneficiaries relative to the overall program, which is 2.02 at age 65, converges more rapidly to 1.0 with increasing age compared to males. Married female GIS beneficiaries experience mortality that is very similar to that of single females without the GIS. As well, females in these two subgroups experience mortality that is similar to the overall program level, with mortality ratios relative to the program close to one at all ages.

Married females not in receipt of GIS benefits experience the lowest mortality at all ages compared to other subgroups. All subgroups show convergence to the overall program mortality as age increases.

Table 21 Mortality by Marital Status and Type of Benefit - Females (2019)

		Without GIS					With GIS				
Year	Overall OAS (annual deaths per thousand)	Married (annual deaths per thousand)	Ratio Married to Overall	Single (annual deaths per thousand)	Ratio Single to Overall	Ratio Single to Married	Married (annual deaths per thousand)	Ratio Married to Overall	Single (annual deaths per thousand)	Ratio Single to Overall	Ratio Single to Married
65	7.2	5.1	0.70	7.7	1.06	1.51	7.8	1.08	14.7	2.02	1.88
70	11.7	8.1	0.69	11.7	1.00	1.45	12.3	1.05	20.1	1.72	1.63
75	19.0	13.7	0.72	18.6	0.98	1.36	18.9	0.99	28.5	1.50	1.51
80	33.0	23.9	0.73	32.9	1.00	1.38	32.3	0.98	41.7	1.26	1.29
85	59.8	46.5	0.78	58.4	0.98	1.25	58.8	0.98	67.6	1.13	1.15
90	112.0	97.1	0.87	108.3	0.97	1.12	109.6	0.98	118.4	1.06	1.08
95	195.4	186.2	0.95	195.0	1.00	1.05	195.9	1.00	196.2	1.00	1.00
100	299.7	299.7	1.00	301.9	1.01	1.01	300.0	1.00	300.7	1.00	1.00

Chart 12 Mortality Ratios by Marital Status and Type of Benefit - Females (2019)



5.3 Life Expectancies by Marital Status and Type of Benefit

5.3.1 Evolution of OAS Beneficiary Life Expectancies by Marital Status

Table 22 shows the life expectancies for beneficiaries by age, sex, and marital status. For both males and females, the life expectancies of married beneficiaries are higher than those of single beneficiaries.

In 2019, the life expectancies at age 65 are 20.7 years for married males and 16.8 years for singles, and the corresponding life expectancies at age 65 for married and single females are 23.5 and 21.1 years, respectively.

For both sexes, the difference in life expectancies between married and single beneficiaries reduces as age increases.

Table 22 OAS Beneficiary Life Expectancies by Marital Status (2019)

	Males				Females			
Age	Overall OAS	Married	Single	Difference Married - Single	Overall OAS	Married	Single	Difference Married - Single
65	19.4	20.7	16.8	3.9	22.2	23.5	21.1	2.4
70	15.7	16.7	13.6	3.1	18.1	19.2	17.3	1.9
75	12.2	12.9	10.8	2.1	14.3	15.2	13.8	1.4
80	9.0	9.6	8.2	1.4	10.7	11.4	10.5	0.9
85	6.4	6.7	5.9	0.8	7.7	8.1	7.6	0.5
90	4.3	4.6	4.1	0.5	5.3	5.4	5.2	0.2

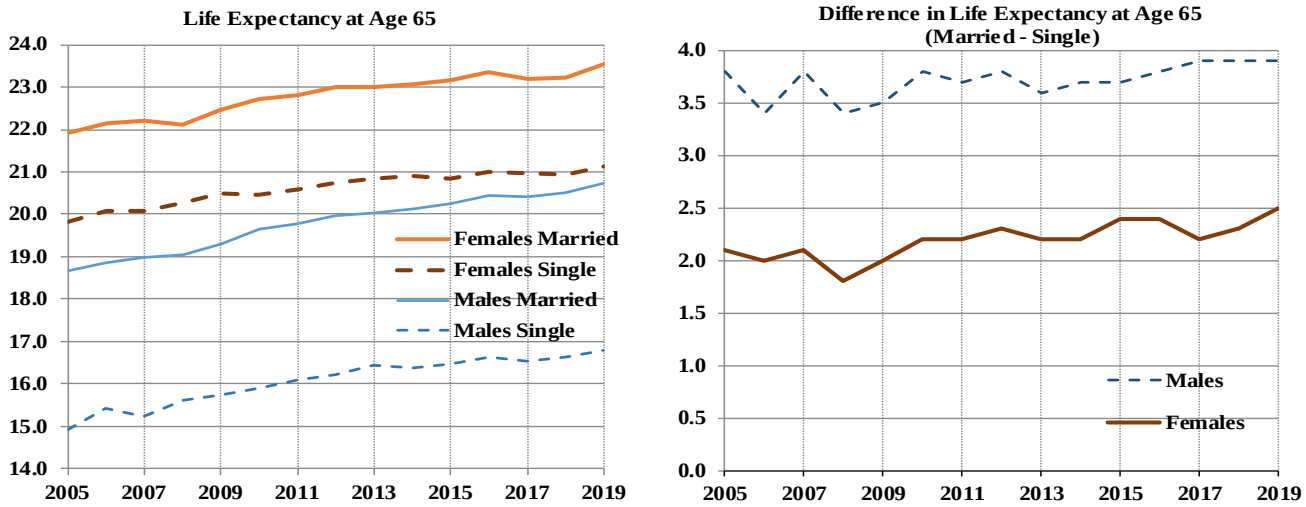
Table 23 and Chart 13 show the evolution of life expectancy at age 65 by sex and marital status for the period 2005 to 2019. Since 2005, for both sexes, the gap in life expectancies at age 65 between married and singles has remained relatively stable, but has increased slightly in recent years and more so for females than males. In 2005, the differentials between married and singles is 3.8 years for males and 2.1 for females. In 2019, the differentials by marital status are 3.9 years and 2.4 years for males and females, respectively.

Table 23 Evolution of OAS Beneficiary Life Expectancies at Age 65 by Marital Status (2005-2019)[(1)]

	Males				Females			
Year	Overall OAS	Married	Single	Difference Married - Single	Overall OAS	Married	Single	Difference Married - Single
2005	17.5	18.7	14.9	3.8	20.7	21.9	19.8	2.1
2006	17.8	18.8	15.4	3.4	21.0	22.1	20.1	2.0
2007	17.8	19.0	15.2	3.8	21.0	22.2	20.1	2.1
2008	18.0	19.0	15.6	3.4	21.1	22.1	20.3	1.8
2009	18.2	19.3	15.8	3.5	21.4	22.5	20.5	2.0
2010	18.5	19.7	15.9	3.8	21.4	22.7	20.5	2.2
2011	18.6	19.8	16.1	3.7	21.5	22.8	20.6	2.2
2012	18.8	20.0	16.2	3.8	21.7	23.0	20.7	2.3
2013	18.9	20.0	16.4	3.6	21.8	23.0	20.8	2.2
2014	18.9	20.1	16.4	3.7	21.9	23.1	20.9	2.2
2015	19.0	20.2	16.5	3.7	21.8	23.2	20.8	2.4
2016	19.2	20.4	16.6	3.8	22.1	23.4	21.0	2.4
2017	19.1	20.4	16.5	3.9	22.0	23.2	21.0	2.2
2018	19.2	20.5	16.6	3.9	22.0	23.2	20.9	2.3
2019	19.4	20.7	16.8	3.9	22.2	23.6	21.1	2.5

(1) Results for years prior to 2005 by marital status are not shown due to data limitation regarding marital status for those years.

Chart 13 Evolution of OAS Beneficiary Life Expectancies at Age 65 by Marital Status
(2005-2019)[1]



(1) Results for years prior to 2005 by marital status are not shown due to data limitation regarding marital status for those years.

5.3.2 Evolution of Life Expectancies by Marital Status and Type of Benefit

Table 24 shows the life expectancies for both sexes by age, marital status, and type of benefit, for the year 2019. For a given marital status, life expectancies of beneficiaries without the GIS are higher than for beneficiaries receiving the benefit. For instance, for single males aged 65, those not in receipt of the GIS live on average 2.8 years longer than those who receive the benefit.

For both sexes and for each benefit type, married beneficiaries live longer than single counterparts. For example, married males aged 65, without the GIS, are expected to live on average 21.1 years or 3.0 years longer than single males (18.1 years). In comparison, for the same benefit subgroup and age, married females are expected to live on average 24.0 years or 1.7 years longer than single females (22.3 years). Married males, aged 65, with the GIS, are expected to live on average 19.5 years or 4.2 years longer than single males (15.3 years). For the same benefit subgroup and age, married females are expected to live on average 22.2 years or 2.2 years longer than single females (20.0 years).

For both sexes in general, single GIS beneficiaries have the lowest life expectancies relative to the other subgroups, while married beneficiaries without the GIS have the highest life expectancies.

Table 24 Life Expectancies by Marital Status and Type of Benefit (2019)

	Males							
Age	Overall OAS Married	Married without GIS	Married with GIS	Difference Married without – with GIS	Overall OAS Single	Single without GIS	Single with GIS	Difference Single without – with GIS
65	20.7	21.1	19.5	1.6	16.8	18.1	15.3	2.8
70	16.7	17.0	15.6	1.4	13.6	14.7	12.5	2.2
75	12.9	13.2	12.2	1.0	10.8	11.4	10.0	1.4
80	9.6	9.7	9.2	0.5	8.2	8.6	7.7	0.9
85	6.7	6.8	6.6	0.2	5.9	6.1	5.7	0.4
90	4.6	4.6	4.5	0.1	4.1	4.2	4.1	0.1

	Females							
Age	Overall OAS Married	Married without GIS	Married with GIS	Difference Married without – with GIS	Overall OAS Single	Single without GIS	Single with GIS	Difference Single without – with GIS
65	23.5	24.0	22.2	1.8	21.1	22.3	20.0	2.3
70	19.2	19.7	18.2	1.5	17.3	18.2	16.5	1.7
75	15.2	15.6	14.3	1.3	13.8	14.4	13.2	1.2
80	11.4	11.8	10.8	1.0	10.5	10.8	10.2	0.6
85	8.1	8.3	7.8	0.5	7.6	7.8	7.4	0.4
90	5.4	5.5	5.3	0.2	5.2	5.3	5.2	0.1

Table 25 and Chart 14 show the evolution of life expectancies at age 65 for both sexes by marital status and type of benefit received for the period 2005 to 2019. Over 2005 to 2019, the life expectancy at age 65 for married males without the GIS increased from 19.2 years to 21.1 years (an increase of 1.9 years). In comparison, for married males with the GIS, life expectancies at age 65 increased from 17.3 to 19.5 years (or by 1.8 years) over the same period. As such, since the mid-2000s, the difference in life expectancies at age 65 for married males between those without and with the GIS has remained relatively stable at around 1.8 years.

Life expectancies at 65 for married females increased from 22.6 to 24.1 years for those without the GIS, and from 20.4 to 22.1 years for those with the benefit over the period 2005 to 2019. For married females age 65, the difference in life expectancies by benefit type fluctuated somewhat more than males, but still remained relatively stable at around 2.0 years from the mid-2000s to 2019.

In comparison, for both single males and females, the differences in life expectancies at age 65 between those without and with the GIS increased overall from the mid-2000s to 2019. For single males, from 2005 to 2019, life expectancy at age 65 for those without the GIS increased by 2.4 years, from 15.7 to 18.1 years. For those receiving the GIS, the increase was 1.4 years, from 13.9 to 15.3 years. As such, the difference in life expectancies at age 65 between single males without and with the GIS increased from 1.9 to 2.8 years over the period 2005 to 2019. Over the same period for single females, life expectancies at age 65 increased by 1.7 years, from 20.6 to 22.3 years for those without the GIS, and by 0.8 of a year, from 19.1 to 20.0 years for those receiving the benefit. Consequently, the difference in life expectancies at age 65 for single females without and with the GIS increased from 1.5 to 2.3 years over 2005 to 2019.

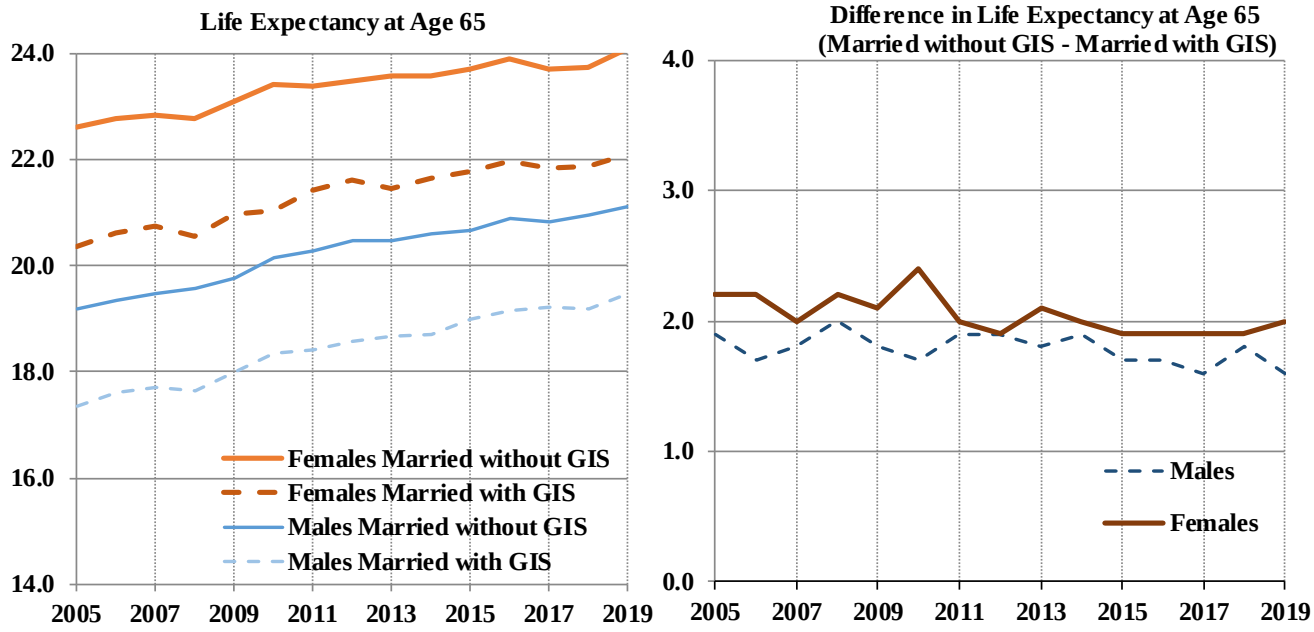
Table 25 Evolution of Life Expectancies at Age 65 by Marital Status and Type of Benefit (2005-2019)[1]

	Males					
Year	Married without GIS	Married with GIS	Difference	Single without GIS	Single with GIS	Difference
2005	19.2	17.3	1.9	15.7	13.9	1.8
2006	19.3	17.6	1.7	16.4	14.2	2.2
2007	19.5	17.7	1.8	16.3	14.0	2.3
2008	19.6	17.6	2.0	16.8	14.2	2.6
2009	19.8	18.0	1.8	16.9	14.4	2.5
2010	20.1	18.4	1.7	16.9	14.7	2.2
2011	20.3	18.4	1.9	17.3	14.7	2.6
2012	20.5	18.6	1.9	17.3	14.9	2.4
2013	20.5	18.7	1.8	17.5	15.1	2.4
2014	20.6	18.7	1.9	17.5	15.0	2.5
2015	20.7	19.0	1.7	17.5	15.2	2.3
2016	20.9	19.2	1.7	17.8	15.2	2.6
2017	20.8	19.2	1.6	17.7	15.2	2.5
2018	21.0	19.2	1.8	17.9	15.2	2.7
2019	21.1	19.5	1.6	18.1	15.3	2.8
	Females					
Year	Married without GIS	Married with GIS	Difference	Single without GIS	Single with GIS	Difference
2005	22.6	20.4	2.2	20.6	19.1	1.5
2006	22.8	20.6	2.2	20.8	19.4	1.4
2007	22.8	20.8	2.0	20.9	19.4	1.5
2008	22.8	20.6	2.2	21.2	19.4	1.8
2009	23.1	21.0	2.1	21.4	19.7	1.7
2010	23.4	21.0	2.4	21.3	19.6	1.7
2011	23.4	21.4	2.0	21.5	19.7	1.8
2012	23.5	21.6	1.9	21.7	19.8	1.9
2013	23.6	21.5	2.1	21.8	19.9	1.9
2014	23.6	21.6	2.0	21.9	19.9	2.0
2015	23.7	21.8	1.9	21.7	20.0	1.7
2016	23.9	22.0	1.9	22.0	20.0	2.0
2017	23.7	21.8	1.9	22.0	20.0	2.0
2018	23.8	21.9	1.9	22.0	19.8	2.2
2019	24.1	22.1	2.0	22.3	20.0	2.3

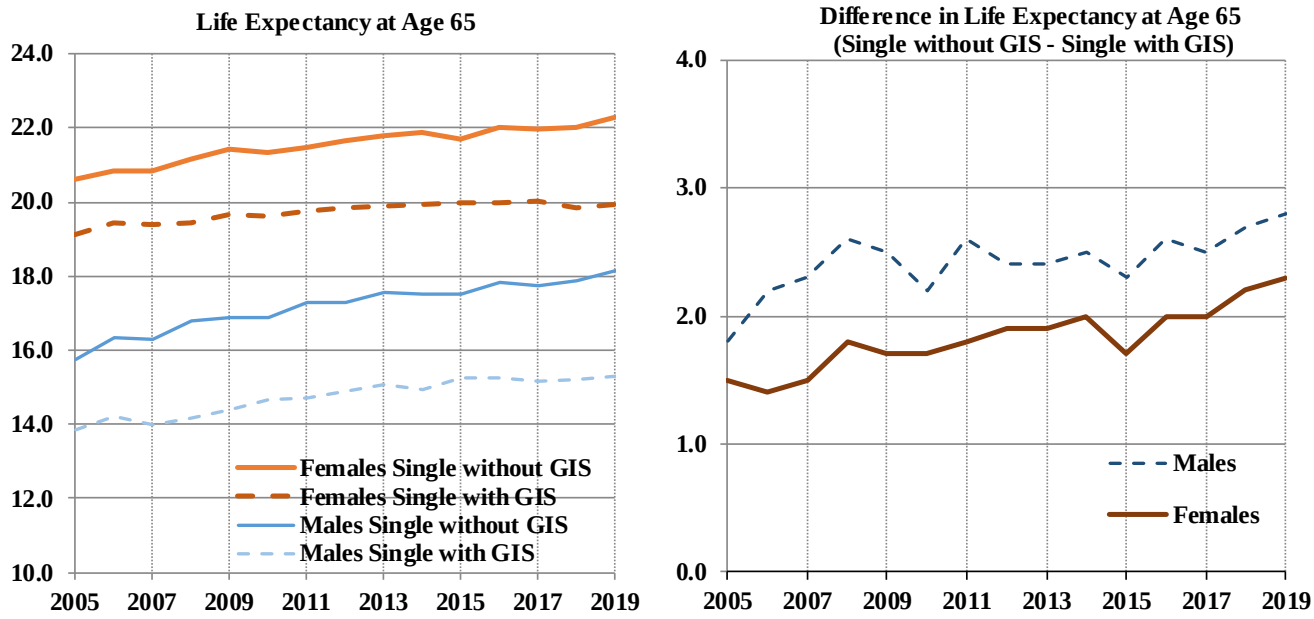
(1) Results for years prior to 2005 are not shown by marital status due to data limitation on marital status for those years.

Chart 14 Life Expectancies at Age 65 by Marital Status and Type of Benefit (2005-2019)[1]

Married



Single



(1) Results for years prior to 2005 are not shown by marital status due to data limitation on marital status for those years.

6 OAS Beneficiary Mortality by Place of Birth

6.1 Introduction

This section presents the results of analysis on the mortality of OAS beneficiaries by whether they were born in Canada or born outside Canada. The results of this study are consistent with the previous OAS program mortality studies prepared by the OCA, which showed that OAS beneficiaries born outside Canada experience lower mortality than those born in Canada. This may be explained by the "healthy immigrant effect" (Vang et al., 2015) that results from several factors, including medical and employability screening prior to entry to Canada as well as cultural and lifestyle characteristics.

First, people in poor health are less likely to migrate to another country. In addition, all potential immigrants to Canada are subject to medical screening. Moreover, immigrants to Canada are partially selected on the basis of employability, which would imply a certain status of health. As new immigrants tend to be healthy, they experience greater life expectancies than those who had immigrated years earlier. Lastly, cultural and lifestyle characteristics of immigrants may also contribute to their relative better health and increased longevities.

6.2 OAS Beneficiary Mortality Experience by Place of Birth for Year 2019

6.2.1 Beneficiaries by Place of Birth

Table 26 shows the proportion of OAS beneficiaries by age group, sex, and place of birth. Overall, about 27% of beneficiaries were born outside Canada. As well, there are higher proportions of beneficiaries born outside Canada at the older age groups.

Table 26 Beneficiaries by Place of Birth (as at December 31st 2019)

	Males			Females		
Age Group	Born in Canada	Born Outside Canada	Proportion Born Outside Canada	Born in Canada	Born Outside Canada	Proportion Born Outside Canada
65-69	744,480	164,428	18%	795,354	197,612	20%
70-74	583,564	220,734	27%	636,389	241,546	28%
75-79	378,599	162,494	30%	436,643	181,454	29%
80-84	228,560	117,109	34%	296,837	141,261	32%
85-89	132,444	71,296	35%	210,471	93,832	31%
90-94	50,440	29,364	37%	110,389	51,578	32%
95-99	10,628	6,587	38%	37,030	17,200	32%
100+	984	652	40%	5,931	2,280	28%
Total	2,129,699	772,664	27%	2,529,044	926,763	27%

Tables 65 to 71 in the Annex show various statistics related to the OAS program by individual age, sex, and place of birth.

6.2.2 OAS Beneficiary Deaths by Place of Birth

Table 27 shows that there is little variation between male and female beneficiaries in the proportions of deaths by age and place of birth, except at ages 95 and over. For age groups between 65 and 94, the proportion of deaths for those born outside Canada varies between 13% and 33% for males and between 14% and 30% for females. At ages 95 and above, the corresponding proportions vary between 35% and 36% for males, and between 26% and 29% for females.

Table 27 OAS Beneficiary Deaths by Place of Birth (2019)

	Males			Females		
Age Group	Born in Canada	Born Outside Canada	Proportion Born Outside Canada	Born in Canada	Born Outside Canada	Proportion Born Outside Canada
65-69	11,421	1,766	13%	7,672	1,224	14%
70-74	13,602	3,717	21%	9,857	2,450	20%
75-79	14,249	4,391	24%	11,235	3,302	23%
80-84	14,817	5,966	29%	13,813	4,787	26%
85-89	15,443	6,847	31%	17,576	6,453	27%
90-94	10,218	5,142	33%	17,020	7,200	30%
95-99	3,497	1,981	36%	9,614	4,018	29%
100+	492	262	35%	2,462	876	26%
Total	83,739	30,072	26%	89,249	30,310	25%

6.2.3 OAS Beneficiary Exposures by Place of Birth

Table 28 shows the proportion of exposures by age group, sex, and place of birth. For male beneficiaries, the increase by age in the proportion of exposures of those born outside Canada reflects the fact that males born outside Canada live longer than those born in Canada. For females, the corresponding proportion by age is much more stable than observed for males.

Table 28 OAS Beneficiary Exposures by Place of Birth (2019)

	Males			Females		
Age Group	Born in Canada	Born Outside Canada	Proportion Born Outside of Canada	Born in Canada	Born Outside Canada	Proportion Born Outside of Canada
65-69	749,524	174,855	19%	790,941	207,064	21%
70-74	570,445	223,569	28%	621,427	242,419	28%
75-79	371,357	160,787	30%	429,138	180,181	30%
80-84	225,652	116,757	34%	294,630	140,752	32%
85-89	131,421	71,209	35%	210,323	93,824	31%
90-94	49,617	29,128	37%	109,904	52,362	32%
95-99	10,384	6,597	39%	36,655	16,998	32%
100+	943	666	41%	5,824	2,307	28%
Total	2,109,343	783,567	27%	2,498,842	935,907	27%

6.2.4 OAS Beneficiary Mortality by Place of Birth

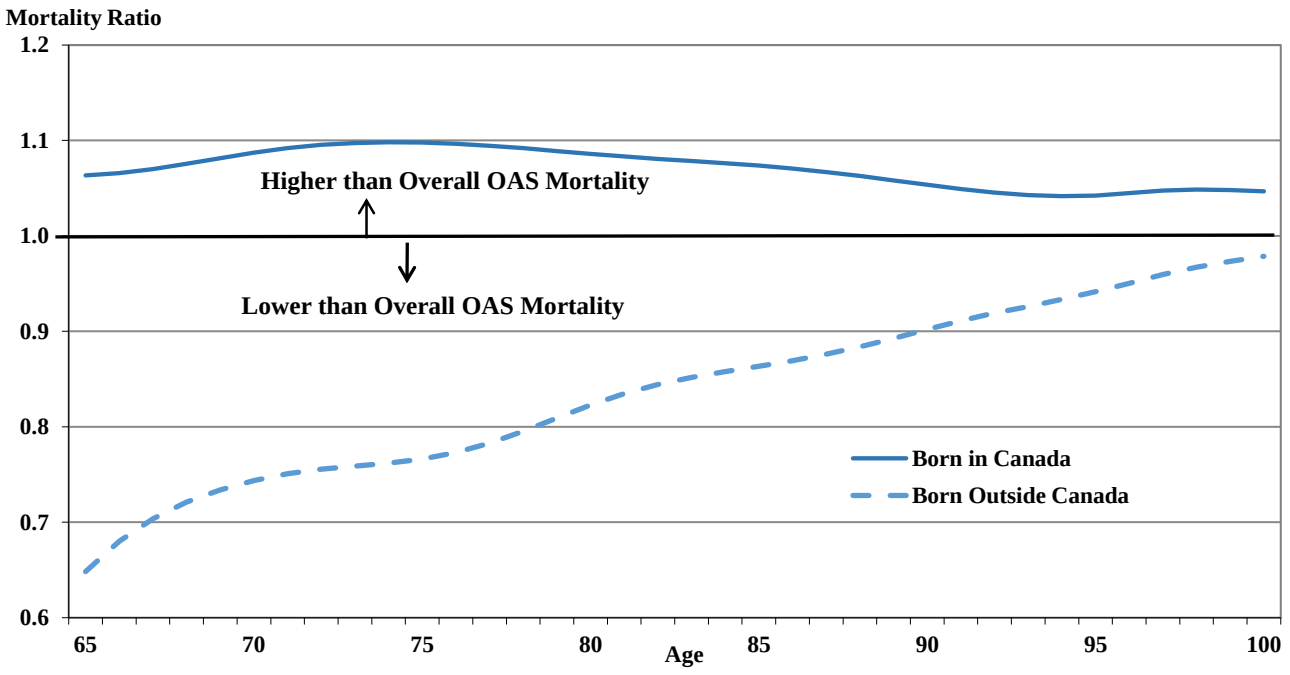
Table 29 and Chart 15 show that, for both sexes, mortality for those born in Canada is higher than the overall OAS program mortality (6% and 7% higher at age 65, respectively for males and females), while mortality is lower for those born outside Canada (35% and 34% lower at age 65, respectively for males and females). In both cases however, mortality approaches that of the overall OAS program as age increases.

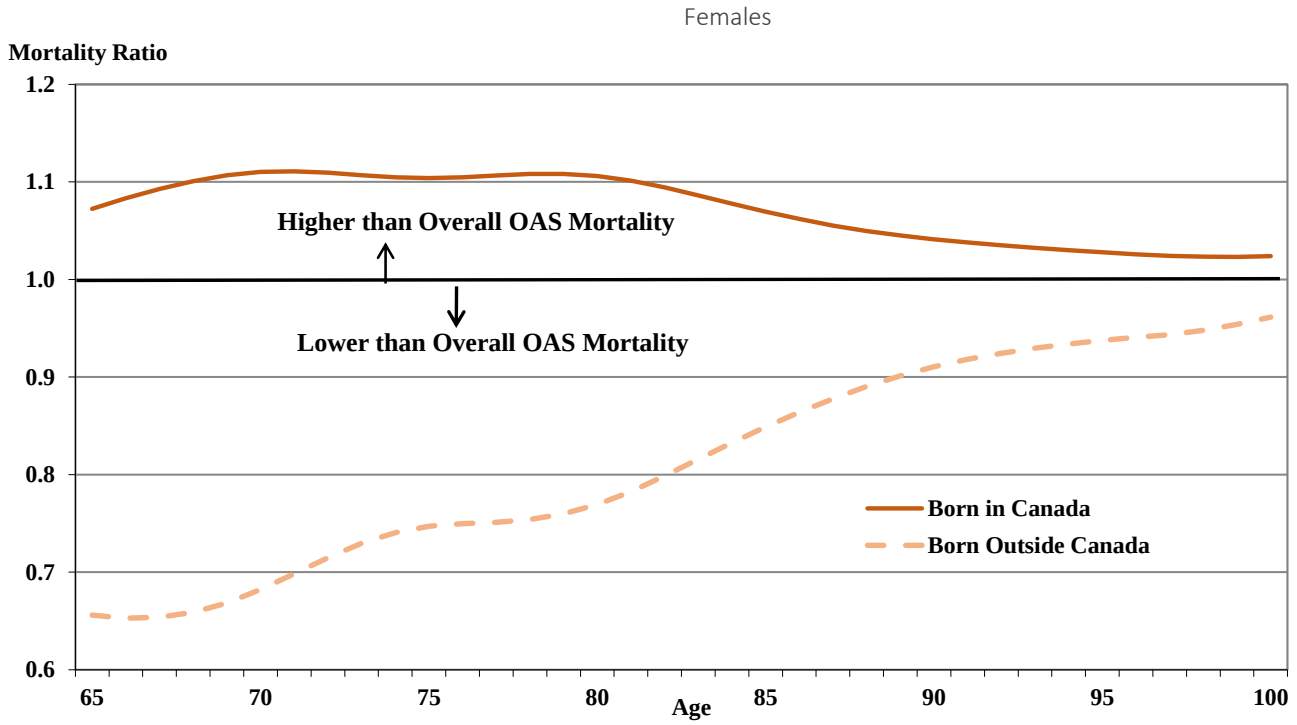
Table 29 OAS Beneficiary Graduated Mortality Rates and Ratios by Place of Birth (2019)

	Males					Females				
Age	Overall OAS (annual deaths per thousand)	Born in Canada (annual deaths per thousand)	Ratio Born in Canada to Overall	Born Outside Canada (annual deaths per thousand)	Ratio Born Outside Canada to Overall	Overall OAS (annual deaths per thousand)	Born in Canada (annual deaths per thousand)	Ratio Born in Canada to Overall	Born Outside Canada (annual deaths per thousand)	Ratio Born Outside Canada to Overall
65	12.0	12.7	1.06	7.8	0.65	7.2	7.8	1.07	4.8	0.66
70	18.1	19.7	1.09	13.5	0.74	11.7	13.0	1.11	8.0	0.68
75	28.4	31.1	1.10	21.7	0.77	19.0	21.0	1.10	14.2	0.75
80	47.5	51.6	1.09	39.1	0.82	33.0	36.5	1.11	25.4	0.77
85	83.6	89.7	1.07	72.2	0.86	59.8	63.9	1.07	50.7	0.85
90	149.7	157.7	1.05	135.0	0.90	112.0	116.7	1.04	102.0	0.91
95	245.0	255.4	1.04	230.7	0.94	195.4	200.8	1.03	183.1	0.94
100	355.8	372.4	1.05	348.2	0.98	299.7	306.9	1.02	288.1	0.96

Chart 15 OAS Beneficiary Mortality Ratios by Place of Birth (2019)

Males





6.3 OAS Beneficiary Life Expectancies by Place of Birth

Table 30 shows life expectancies of OAS program beneficiaries by place of birth. For male beneficiaries, life expectancies at age 65 are 21.0 years for those born outside Canada and 18.8 years for those born in Canada, for a difference of 2.2 years. For female beneficiaries, life expectancies at age 65 are 23.8 years for those born outside Canada and 21.6 years for those born in Canada, a difference also of 2.2 years. For both sexes, the difference in life expectancies by place of birth reduces as age increases.

Table 30 OAS Beneficiary Life Expectancies by Place of Birth (2019)

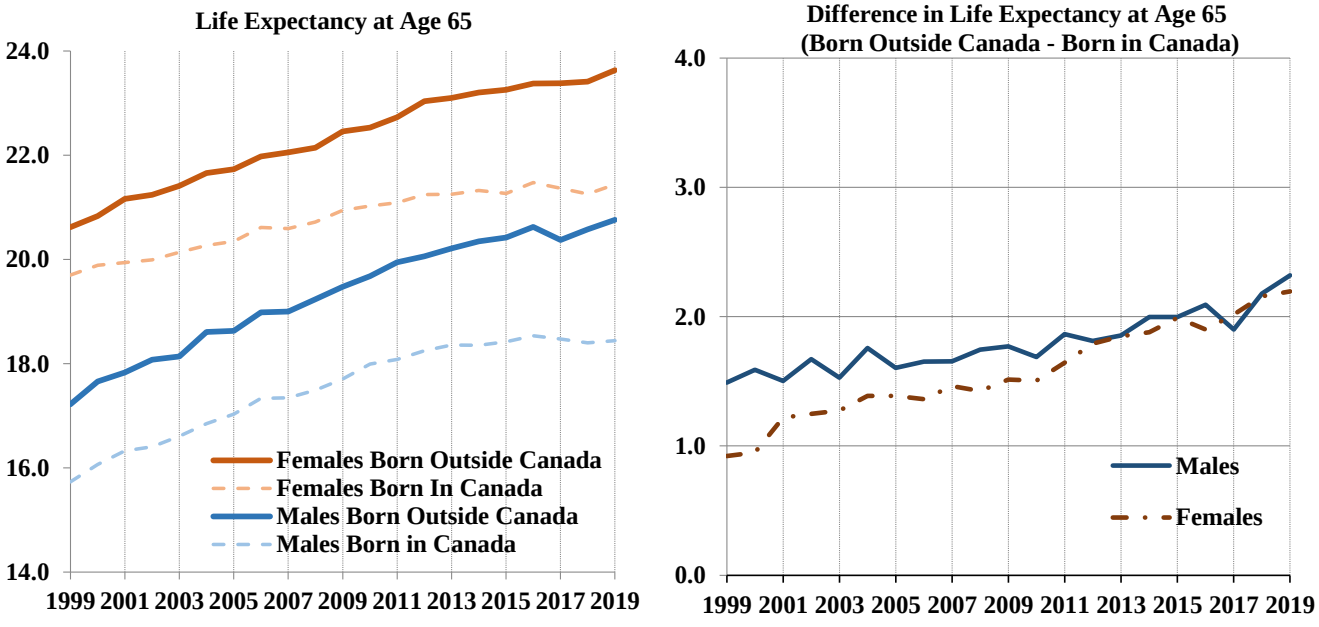
	Males				Females			
Age	Overall OAS	Born Outside Canada	Born In Canada	Difference Born Outside – In Canada	Overall OAS	Born Outside Canada	Born In Canada	Difference Born Outside – In Canada
65	19.4	21.0	18.8	2.2	22.2	23.8	21.6	2.2
70	15.7	16.9	15.1	1.8	18.1	19.4	17.6	1.8
75	12.2	13.2	11.7	1.5	14.3	15.3	13.8	1.5
80	9.0	9.7	8.7	1.0	10.7	11.5	10.4	1.1
85	6.4	6.8	6.1	0.7	7.7	8.2	7.5	0.7
90	4.3	4.6	4.2	0.4	5.3	5.5	5.1	0.4

Table 31 and Chart 16 show that, for both sexes over the period 1999 to 2019, the gap between the life expectancies at age 65 of OAS beneficiaries born outside Canada and those born in Canada has increased. In 1999, the differential by place of birth was 1.5 years for males and 0.9 of a year for females. By 2019, the differential by place of birth for males was 2.3 years and 2.2 years for females.

Table 31 Evolution of OAS Beneficiary Life Expectancies at Age 65 by Place of Birth (1999-2019)

	Males			Females		
Year	Born Outside Canada	Born In Canada	Difference Born Outside – In Canada	Born Outside Canada	Born In Canada	Difference Born Outside – In Canada
1999	17.2	15.7	1.5	20.6	19.7	0.9
2000	17.7	16.1	1.6	20.8	19.9	0.9
2001	17.8	16.3	1.5	21.2	19.9	1.3
2002	18.1	16.4	1.7	21.2	20.0	1.2
2003	18.1	16.6	1.5	21.4	20.1	1.3
2004	18.6	16.9	1.7	21.7	20.3	1.4
2005	18.6	17.0	1.6	21.7	20.3	1.4
2006	19.0	17.3	1.7	22.0	20.6	1.4
2007	19.0	17.3	1.7	22.1	20.6	1.5
2008	19.2	17.5	1.7	22.1	20.7	1.4
2009	19.5	17.7	1.8	22.5	20.9	1.6
2010	19.7	18.0	1.7	22.5	21.0	1.5
2011	19.9	18.1	1.8	22.7	21.1	1.6
2012	20.1	18.3	1.8	23.0	21.2	1.8
2013	20.2	18.4	1.8	23.1	21.3	1.8
2014	20.3	18.4	1.9	23.2	21.3	1.9
2015	20.4	18.4	2.0	23.3	21.3	2.0
2016	20.6	18.5	2.1	23.4	21.5	1.9
2017	20.4	18.5	1.9	23.4	21.4	2.0
2018	20.6	18.4	2.2	23.4	21.3	2.1
2019	20.8	18.4	2.4	23.6	21.4	2.2

Chart 16 Evolution of OAS Beneficiary Life Expectancies at Age 65 by Place of Birth (1999-2019)



7 OAS Beneficiary Mortality Improvement Rates

Historical average annual mortality improvement rates measure the pace of change in mortality over time. The improvement in mortality indicates that mortality rates have decreased over time, which in turn has led to increased longevity. Mortality improvement rates may be used to formulate assumptions about how mortality and consequently life expectancies may evolve in the future.

7.1 Evolution of OAS Beneficiary Mortality Improvement Rates

Table 32 and Chart 17 compare OAS beneficiary mortality improvement rates experienced over the years 2000 to 2014 to those experienced over the more recent years from 2015 to 2019

The average annual mortality improvement rate for males in the age group 65 to 74 over the years 2000 to 2014 is 2.7%, and this compares to a lower level of 1.0% over the more recent years 2015 to 2019. In comparison, for the same age group, the average annual mortality improvement rate for females is 1.9% over the years 2000 to 2014, which compares to a lower level of 1.0% over the more recent years 2015 to 2019.

For the age group 75 to 89, the average annual mortality improvement rates experienced over the years 2000 to 2014 are 2.4% for males and 1.7% for females. These rates are higher than the experience over the more recent years 2015 to 2019 (1.3% and 0.9% for males and females, respectively).

For both male and female beneficiaries, the average annual mortality improvement rates over the period 2015 to 2019 are lower than the rates over the period 2000 to 2014.

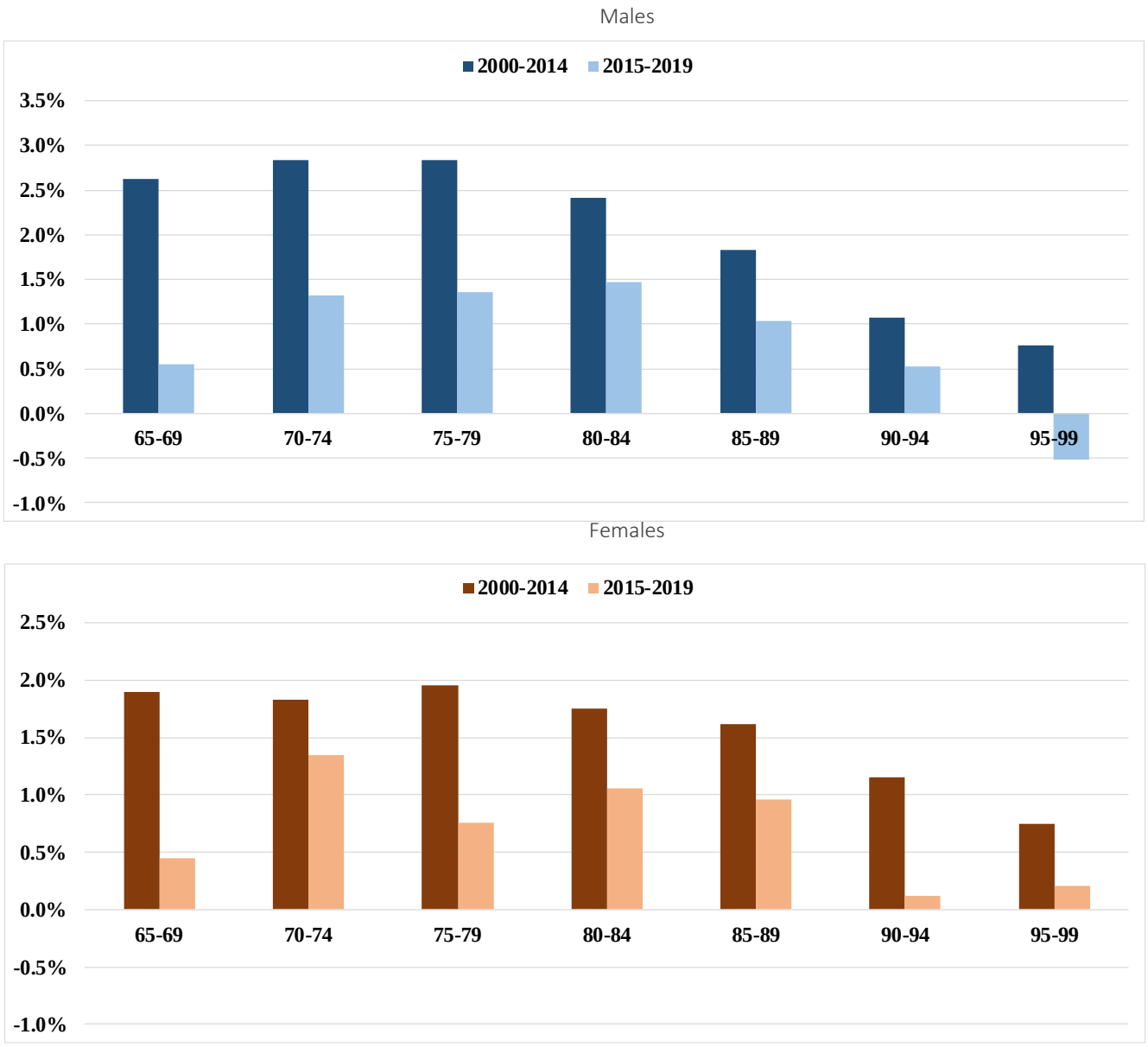
Overall, the average annual mortality improvement rates over the period 2015 to 2019 are 1.0% and 0.7% males and females, respectively

Table 32 OAS Beneficiary Average Annual Mortality Improvement Rates

	2000-2014[1,2]		2015-2019[1,2]		2000-2019[1,2]	
Age Group	Males	Females	Males	Females	Males	Females
65-69	2.6%	1.9%	0.6%	0.4%	2.0%	1.6%
70-74	2.8%	1.8%	1.3%	1.3%	2.4%	1.6%
75-79	2.8%	2.0%	1.4%	0.8%	2.5%	1.7%
80-84	2.4%	1.7%	1.5%	1.1%	2.2%	1.6%
85-89	1.8%	1.6%	1.0%	1.0%	1.6%	1.5%
90-94	1.1%	1.1%	0.5%	0.1%	1.0%	1.0%
95-99	0.8%	0.7%	-0.5%	0.2%	0.6%	0.7%
100+	0.3%	0.6%	-0.9%	0.2%	0.4%	0.4%
Total	2.2%	1.5%	1.0%	0.7%	2.0%	1.3%
65-74	2.7%	1.9%	1.0%	1.0%	2.3%	1.6%
75-89	2.4%	1.7%	1.3%	0.9%	2.1%	1.6%

(1) Improvement rates obtained using the corresponding 2019 exposures and populations as weights.
(2) The results shown here are consistent with the ones presented in the OCA OAS Mortality fact sheet 2020.

Chart 17 OAS Beneficiary Mortality Improvement Rates



7.1.1 Comparison of OAS Beneficiary and Population Mortality Improvements

Table 33 compares the OAS beneficiary average annual mortality improvement rates with those of the population of Canada. For the years 2000 to 2019, mortality improvement rates of OAS beneficiaries for both sexes and most age groups are similar to those observed for the general population.

Over the period 2015 to 2019, the overall mortality improvement rate for male beneficiaries is 1.0%, which is similar to that for the general population. The corresponding mortality improvement rates for female beneficiaries and the population are 0.7% and 0.6%, respectively.

Table 33 OAS Beneficiary and Population Average Annual Mortality Improvement Rates[1]

	Males				Females			
	2000-2014		2015-2019		2000-2014		2015-2019	
Age Group	OAS	Population[1]	OAS	Population[1]	OAS	Population[1]	OAS	Population[1]
65-69	2.6%	2.6%	0.6%	1.1%	1.9%	1.3%	0.4%	1.1%
70-74	2.8%	2.7%	1.3%	1.1%	1.8%	0.9%	1.3%	0.9%
75-79	2.8%	2.6%	1.4%	1.0%	2.0%	0.5%	0.8%	0.8%
80-84	2.4%	2.6%	1.5%	1.0%	1.7%	1.1%	1.1%	0.6%
85-89	1.8%	2.2%	1.0%	0.9%	1.6%	1.7%	1.0%	0.5%
90-94	1.1%	1.4%	0.5%	0.8%	1.1%	1.6%	0.1%	0.4%
95-99	0.8%	0.7%	-0.5%	0.8%	0.7%	0.4%	0.2%	0.8%
100+	0.3%	0.3%	-0.9%	0.7%	0.6%	0.0%	0.2%	0.8%
Total	2.2%	2.4%	1.0%	1.0%	1.5%	1.2%	0.7%	0.6%
65-74	2.7%	2.7%	1.0%	1.1%	1.9%	1.1%	1.0%	1.0%
75-89	2.4%	2.5%	1.3%	1.0%	1.7%	1.2%	0.9%	0.6%

(1) Population mortality improvement rates are based on Statistics Canada's 2019 CLT data using the 2019 population as weights. OCA calculations.

7.1.2 Mortality Improvement Rates by Type of Benefit

Table 34, Table 35 and Chart 18 show mortality improvement rates for two periods, 2000 to 2014 and 2015 to 2019 by age group, sex, and type of benefit received. For both sexes, mortality improvements for GIS beneficiaries have generally been lower than for OAS beneficiaries not receiving the GIS. For example, over the years 2015 to 2019, for ages 65 to 74, GIS beneficiaries experienced average annual mortality improvement rates of 0.6% for males and 0.2% for females, which compare to average annual improvement rates of 1.5% for males and females not receiving the GIS.

Comparing two periods 2000 to 2014 and 2015 to 2019, mortality improvement rates are generally lower in 2015 to 2019 by age group, sex and type of benefits received. For example, over the years 2015 to 2019, for ages 65 to 74, GIS beneficiaries experienced average annual mortality improvement rates of 0.6% for males and 0.2% for females, which compare to average annual improvement rates of 2.0% for males and 1.4% for females not receiving the GIS during years 2000-2014.

Table 34 Average Annual Mortality Improvement Rates by Type of Benefit (2000-2014)

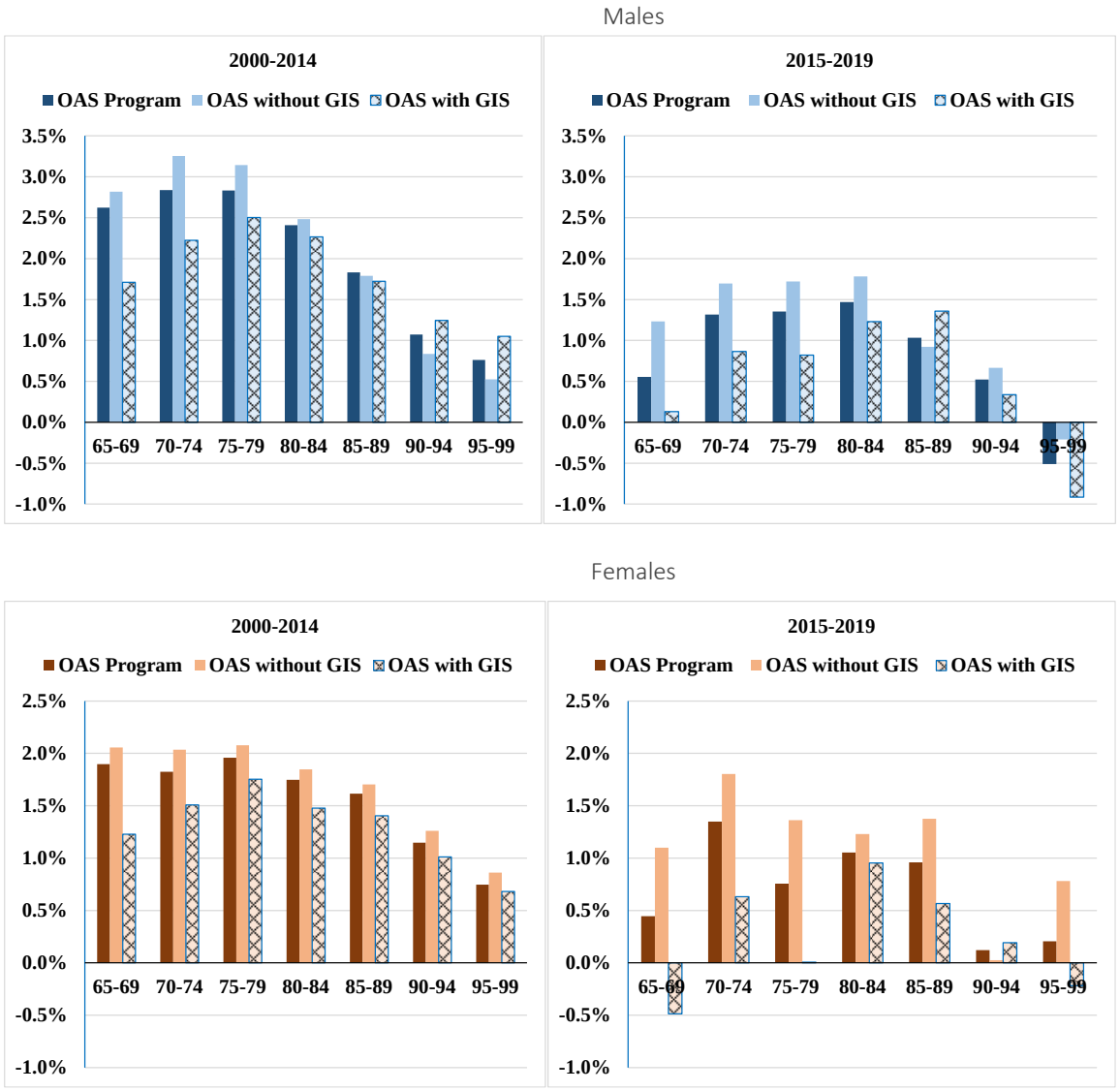
	Males				Females			
Age Group	Overall OAS	without GIS	with GIS	Difference	Overall OAS	without GIS	with GIS	Difference
65-69	2.6%	2.8%	1.7%	1.1%	1.9%	2.1%	1.2%	0.9%
70-74	2.8%	3.3%	2.2%	1.1%	1.8%	2.0%	1.5%	0.5%
75-79	2.8%	3.1%	2.5%	0.6%	2.0%	2.1%	1.8%	0.3%
80-84	2.4%	2.5%	2.3%	0.2%	1.7%	1.8%	1.5%	0.3%
85-89	1.8%	1.8%	1.7%	0.1%	1.6%	1.7%	1.4%	0.3%
90-94	1.1%	0.8%	1.2%	-0.4%	1.1%	1.3%	1.0%	0.3%
95-99	0.8%	0.5%	1.1%	-0.6%	0.7%	0.9%	0.7%	0.2%
Total	2.2%	2.4%	2.0%	0.4%	1.5%	1.7%	1.3%	0.4%
65-74	2.7%	3.1%	2.0%	1.1%	1.9%	2.0%	1.4%	0.6%
75-89	2.4%	2.5%	2.2%	0.3%	1.7%	1.9%	1.5%	0.4%

Table 35 Average Annual Mortality Improvement Rates by Type of Benefit (2015-2019)

	Males				Females			
Age Group	Overall OAS	without GIS	with GIS	Difference	Overall OAS	without GIS	with GIS	Difference
65-69	0.6%	1.2%	0.1%	1.1%	0.4%	1.1%	-0.5%	1.6%
70-74	1.3%	1.7%	0.9%	0.8%	1.3%	1.8%	0.6%	1.2%
75-79	1.4%	1.7%	0.8%	0.9%	0.8%	1.4%	0.0%	1.4%
80-84	1.5%	1.8%	1.2%	0.6%	1.1%	1.2%	1.0%	0.2%
85-89	1.0%	0.9%	1.4%	-0.5%	1.0%	1.4%	0.6%	0.8%
90-94	0.5%	0.7%	0.3%	0.4%	0.1%	0.0%	0.2%	-0.2%
95-99	-0.5%	-0.2%	-0.9%	0.7%	0.2%	0.8%	-0.2%	1.0%
Total	1.0%	1.3%	0.8%	0.5%	0.7%	1.1%	0.3%	0.8%
65-74	1.0%	1.5%	0.6%	0.9%	1.0%	1.5%	0.2%	1.3%
75-89	1.3%	1.5%	1.1%	0.4%	0.9%	1.3%	0.6%	0.7%

As mortality improvement rates have been lower for those receiving the GIS, the gap in life expectancies at age 65 between those with and without GIS has increased over the years 2000 to 2019 (as shown earlier in Table 16).

Chart 18 OAS Mortality Improvement Rates by Type of Benefit



8 Conclusion

In general, this study confirms the results that were obtained by the previous OAS program mortality studies. The analysis by type of benefit received shows that beneficiaries who do not receive the GIS experience lower mortality compared to those who receive the GIS. The analysis by marital status shows that beneficiaries who are married experience lower mortality than single beneficiaries. The analysis by place of birth shows that beneficiaries who were born outside Canada experience lower mortality than those born in Canada.

The study also reveals that mortality improvement rates over the recent years from 2015 to 2019 have been generally lower than improvement rates experienced over the previous 15 year period from 2000 to 2014.

Appendix A — Annex – Detailed Tables by Year, Age and Sex

Please download Excel for detailed Tables 36 to 71. (need to have a valid link for the Excel on the Web).

Annex Tables

Appendix B — References

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Appendix C — Acknowledgements:

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