Mortality projections for Social Security Programs in Canada and the United States

Presentation to the 15th International Conference of Social Security Actuaries and Statisticians of ISSA, Helsinki, Finland

24 May 2007
Presentation

• General Population Mortality Trends in Canada
• Mortality Projections for Social Security Programs in Canada
• Stochastic Process
• Future Challenges – World Comparison

Photographed by Lassi Kujala
Life Expectancy at Birth

Office of the Chief Actuary

Bureau de l’actuaire en chef
Life Expectancy at Age 65

[Graph showing life expectancy differences between males and females from 1901 to 2006.]

Office of the Chief Actuary
Bureau de l’actuaire en chef
Average Annual Rates of Mortality Improvement (2001 Population-Weighted)
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## Assumed Annual Rates of Improvement

<table>
<thead>
<tr>
<th>Age</th>
<th>2002-2006</th>
<th>2026+</th>
<th>2002-2006</th>
<th>2026+</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>0</td>
<td>2.25</td>
<td>1.35</td>
<td>2.50</td>
<td>1.25</td>
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<tr>
<td>45-64</td>
<td>2.50</td>
<td>0.65</td>
<td>1.65</td>
<td>0.55</td>
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<tr>
<td>65-84</td>
<td>1.80</td>
<td>0.50</td>
<td>1.05</td>
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<tr>
<td>85-99</td>
<td>0.10</td>
<td>0.40</td>
<td>0.05</td>
<td>0.40</td>
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</tbody>
</table>

For the next 25 years (2002-2026), the average annual rates of mortality improvement is respectively 1.2% and 0.8% for males and females aged between 65 and 84.
Projected Mortality rates (Birth to age 1)
Projected Mortality rates (Ages 45 to 64)

(per 1000)
Projected Mortality rates (Ages 65 to 84)
70% of males could expect to die between ages 17 and 83 (1925), between 65 to 91 (2000) and between 71 and 94 (2050)
Survival Curves at Birth for Canadian Females

70% of females could expect to die between ages 24 and 84 (1925), between 71 and 94 (2000) and between 74 and 96 (2050)
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Photographed by Kari Palsila
Stochastic Process

Canada: Mortality Rates, Male Age 65-69 (1926-2079)
# Stochastic Process

Canadian Life Expectancies, with improvements after the year shown

<table>
<thead>
<tr>
<th>At birth</th>
<th>Actuarial Report</th>
<th>Stochastic Process</th>
<th>Lower 95% CI</th>
<th>Higher 95% CI</th>
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<tbody>
<tr>
<td><strong>Males</strong></td>
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<tr>
<td>2025</td>
<td>84.2</td>
<td>84.4</td>
<td>78.7</td>
<td>88.4</td>
</tr>
<tr>
<td>2050</td>
<td>85.5</td>
<td>85.5</td>
<td>80.4</td>
<td>89.5</td>
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<tr>
<td><strong>Females</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2025</td>
<td>87.4</td>
<td>87.3</td>
<td>79.8</td>
<td>92.0</td>
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<tr>
<td>2050</td>
<td>88.6</td>
<td>88.4</td>
<td>81.3</td>
<td>92.7</td>
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<table>
<thead>
<tr>
<th>At 65</th>
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<tr>
<td><strong>Males</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2025</td>
<td>19.6</td>
<td>19.9</td>
<td>17.1</td>
<td>22.3</td>
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<tr>
<td>2050</td>
<td>20.5</td>
<td>21.1</td>
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<td>24.2</td>
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<tr>
<td><strong>Females</strong></td>
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<td>23.5</td>
<td>17.7</td>
<td>27.5</td>
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</tbody>
</table>
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Probability of Surviving
(World comparison)

Office of the Chief Actuary   Bureau de l’actuaire en chef
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Thank you   Kiitos