COUNTRY REPORT - SWEDEN

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A person injured in traffic may be entitled to compensation for loss of income. Small amounts are often paid as lump sums, while larger amounts are paid as annuities as long as the injured lives.

A mortality assumption is necessary when calculating the technical provisions for these annuities and most insurance companies use a mortality table based on the general population. The question is if these injured people have a higher mortality than the general population.

In 2015 Insurance Sweden started a project collecting information from the portfolios of annuities in the largest insurance companies providing third party motor insurance. The conclusion was that the mortality was slightly higher for men younger than 60 years compared to the general population younger than 60 years. For men older than 60 years and for women the mortality was in line with the general population. There were not enough observations to develop a new mortality table, so the recommendation is to keep using the same table based on the general population.

There are no major research projects about mortality issues in progress.
## Country Background

### Population

#### Demographics

<table>
<thead>
<tr>
<th>Basic Information</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current population</strong></td>
<td>9.9 million estimated 31 Dec 2015&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Current period life expectancy</strong></td>
<td></td>
</tr>
<tr>
<td>- At birth</td>
<td>80.31 male / 84.01 female estimated 2015&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td>- At 65</td>
<td>18.85 male / 21.39 female estimated 2015&lt;sup&gt;3&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

#### Population Pyramid as of 31 Dec 2015

[Population Pyramid Diagram]

Source: Statistics Sweden<sup>4</sup>

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<sup>3</sup> Statistics Sweden. Same source as for life expectancy at birth.


### POPULATION MORTALITY TABLES

Death rates 2015 by sex and age by end of the year.

![Graph showing population mortality rates](image)

### POPULATION MORTALITY IMPROVEMENTS

Sweden began to collect population statistics in 1749. Sweden – and Finland, which was then a part of Sweden – are the only countries that possess continuous records of their population so far back in time.

The quality of the data for 1751-1860 is lower than in later years and should be used with caution.

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6 Data in this section has been downloaded in April-2015 from Human Mortality Database. University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany). Available at www.mortality.org or www.humanmortality.de.
LIFE EXPECTANCY AT BIRTH

The life expectancy at birth has increased almost continuously since 1860. The 1918 flu pandemic (Spanish flu) is an outlier.

REMAINING LIFE EXPECTANCY AT AGE 65
TOTAL LIFE EXPECTANCY GIVEN THAT A CERTAIN AGE IS REACHED

For example, in 1900 a 65 year old man was expected to live for 12 more years which makes a total of 77 years. By plotting the total life expectancy given that 65 is we can compare with life expectancy at birth.
With a few more ages added we can study data from 1870 and forward.

Mortality for ages below 90 has decreased, but for people over 90 the total life expectancy is pretty much the same. Is this pattern the same in all countries?
LIFE INSURANCE

This section provides background on both the life insurance protection environment and the annuity/pension market.

MARKET BACKGROUND

PREMIUM INCOME OF LIFE INSURANCE COMPANIES

The premium income in 2015 for life insurance was 220 billion SEK (≈24 billion EUR). A large part of the Swedish life insurance market consists of occupational pension.

Source: Insurance Sweden⁷.

ASSETS OF LIFE INSURANCE COMPANIES

The assets of the Swedish life insurance companies in the end of 2015 was 3 500 billion SEK (≈380 billion EUR).

Source: Statistics Sweden⁸.

⁷ http://www.svenskforsakring.se/
In 2007 the Swedish Research Board for Actuarial Science published an investigation of the mortality among the Swedish insurance population. The main purpose was to study the mortality in pensions. An update of this investigation was published in 2014\(^9\).

The population mortality from the years 1985-2012 was used to fit a Lee-Carter model. The parameters in this model were used to estimate the future population mortality.

Information of risk population and deaths were collected from several Swedish life insurance companies during the period 2001-2012. The risks were divided into two categories:

- Compulsory insured are often occupational pensions where all employees are covered by a pension plan.
- Voluntarily insured are individually written pensions.

The probability of death within a year was calculated for both categories and compared with the population mortality.

The probability of a death within a year for a 30 year old compulsory insured man is 87% of the probability for a 30 year old man in the general population. For a 30 year old woman the ratio is 80%. For ages above 75 the mortality for compulsory insured is the same as the general population. The ratio for all ages is plotted in the graph below.

\(^9\) [http://www.svenskforsakring.se/dus14](http://www.svenskforsakring.se/dus14)
Voluntarily insured have lower probability of death than compulsory insured. The ratio for all ages is plotted in the graph below.

We assume that these ratios remain the same in the future and use our estimation of the future population mortality to estimate the future mortality of the insured population and produce mortality tables.

One way of illustrating the result is to calculate the total life expectancy. A compulsory insured 30 year old man (born in 1986) is expected to live for 86.6 years. A voluntarily insured 40 year old woman (born in 1976) is expected to live for 89.6 years. See table below.

<table>
<thead>
<tr>
<th></th>
<th>Compulsory insured</th>
<th>Voluntarily insured</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>30</td>
<td>86.6</td>
<td>88.5</td>
</tr>
<tr>
<td>40</td>
<td>85.9</td>
<td>88</td>
</tr>
<tr>
<td>50</td>
<td>85.2</td>
<td>87.6</td>
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<tr>
<td>60</td>
<td>84.8</td>
<td>87.6</td>
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<tr>
<td>70</td>
<td>85.5</td>
<td>88.1</td>
</tr>
<tr>
<td>80</td>
<td>88.2</td>
<td>90</td>
</tr>
<tr>
<td>90</td>
<td>93.7</td>
<td>94.5</td>
</tr>
</tbody>
</table>
RELEVANT ORGANISATIONS

DETAILS ON GOVERNMENT STATISTICS DEPARTMENT

Statistics Sweden is the Swedish administrative agency for producing and communicating statistical data.
Website: http://www.scb.se/en_

ACTUARIAL SOCIETY OF THE COUNTRY

The Swedish Society of Actuaries (Svenska Aktuarieföreningen) was founded in 1904 and is a full member of IAA.
Website (only in Swedish): http://www.aktuarieforeningen.se/

INSURANCE REGULATOR

A large part of the regulation for European financial institutions comes from the European Union.
http://europa.eu/

European Insurance and Occupational Pensions Authority (EIOPA).
https://eiopa.europa.eu/

Swedish Ministry of Finance

The Swedish financial supervisory authority (Finansinspektionen).
Website: http://fi.se/Folder-EN/Startpage/

BUSINESS INTEREST ASSOCIATION

Insurance Sweden (Svensk Försäkring) is the Swedish industry organisation for insurance companies.
http://www.svenskforsakring.se/en

Insurance Sweden is a member of Insurance Europe.
http://www.insuranceeurope.eu/