The EHEMU Web site

(European Health Expectancy Monitoring Unit)

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INTERPRETING HEALTH EXPECTANCIES

Most countries in the world are aging rapidly with longer and longer life expectancies. Whether these extra years are healthy or not is increasing disability and dependence is important for governments, health, and social services. The European Commission's Health Expectancy Monitoring Unit (EHEMU) has developed this guide to aid the understanding and interpreting health expectancies and to accompany the more technical guide on how to calculate health expectancies.

What are healthy expectancies?

Health expectancies are a corrected extension of the well-known indicators of life expectancy. Life expectancies measure the number of remaining years to be lived at a particular age, considering the current mortality level of the country. For example, in 2004 the female life expectancy at birth in Belgium was 83.4 years, so a baby girl born in 2004 could expect to live to age 83 years, assuming the conditions of 2004 prevailed over her whole life. By considering not only mortality but also ill-health at particular ages we can divide this remaining number of years into spent in good and bad health: three main dimensions of health expectancies. Health expectancies add a quality dimension to the quantity of life lived.

As there are many dimensions of health, there are many health expectancies. The proposed new EU structural indicator Healthy Life Years (HLY) is based on limitations on daily activities and is therefore a disability-free life expectancy. One of the most common health expectations is the healthy life expectancy, based on the self-rated health question: "How is your health in general?"; and life expectancy free of specific disorders, for instance dementia-free life expectancy.

Example 1
A common way to illustrate health expectancies is shown in Figure 1, where we have plotted life expectancy (LE)

Health Expectancy Calculation by the Sullivan Method: A Practical Guide

3rd Edition
Glossary

1. Abridged life table: A life table in which values of the life table functions are presented for certain age groups only, rather than for every single year of age.
2. Age interval: The period of life between two ages, usually in years. For example, 10–14 is the 5-year age interval between the 10th and 14th birthdays.
3. Central death rate, cax: The mortality rate at age x, calculated by using the mid-year population as denominator.
4. Confidence interval: The computed interval with a given probability, e.g., 95%, that the true value of a variable such as a mean, proportion, or rate is contained within the interval.
5. Cross-sectional survey: A study that aims to describe the relationship between variables (or other health-related rates or variables) and other factors of interest that exist in a specified population at one particular time.
6. Covariance of the survival curve over the age interval: An measurement of how fast the survival curve is changing direction (how much it is bending) within the age interval.
7. Death curve: The number of deaths during a given period in a specified population.
8. Disability-free life expectancy: The average number of years an individual is expected to live free of disability if current patterns of mortality and disability continue to apply. A statistical deduction based on existing age-specific death rates and either age-specific disability prevalences or age-specific disability transition rates.
9. Health expectancy: The average number of years an individual is expected to live in a given health state if current patterns of mortality and health states continue to apply. Health expectancy is a general term, referring to any one of a class of indicators. Specific health expectancies are based on health states defined by concepts of health, mortality, or disability (i.e., impairment, disability, and handicap).
Healthy Life Years (HLY)

- Healthy Life Years in the core of the Lisbon Strategy (by SANCO)
- Official values (structural indicators on health) by Eurostat
- European Task Force on Health Expectancies (TF-HE)
Data selection

a. Population data
- Population estimates
- Birth counts

b. Life table series
- No life expectancy
- Probability of dying
- Number of survivors
- Number of deaths
- Complete life tables

Health data
- Prevalence (survey data)
- Institutional population

Health expectancy
- Health expectancy
- Health to life expectancy ratio
- Complete health expectancy table

Health expectancy

Life expectancy is composed of lengths of time spent in different states of health until death. These lengths of time in different states of health are health expectancies and they combine information on both morbidity and mortality.

Health expectancies, of which disability-free life expectancy (DFLE) is one, provide a means of dividing life expectancy into life spent in various states of good and bad health. These measures helped the World Health Organization development of the health of the world (WHO) in health policy rather than in pronouncements on the quality of life expectancy. Health expectancies extend the concept of life expectancy to mortality and disability. Health expectancies address whether or not the lengthening in life expectancy is being accompanied with an increase in time lived in bad health.

The idea of health expectancy had been put forward by Baxters as early as 1964 and in a first method of calculation had been proposed by Sullivan in 1971. Since then, health expectancies have been increasingly used in industrialized countries to assess the evolution of the population's health status, in particular for older people. Being independent of the size of populations and of their age structure, health expectancies allow a direct comparison of the different groups that make up populations, e.g., females, socio-economic category, regions.

The European structural indicator Healthy Life Years (HLY) is one of these health expectancies belonging to the class of disability-free life expectancy (DFLE).

Source: EHEMU Technical Report 3002

Calculation of Disability-Free Life Expectancy (DFLE)

Now we need to enter the disability prevalence. We do not have this in single years of age so we match up the prevalence data to the life table data by assuming that each single year of age has the same prevalence as that age group (compare Table l in and Table 14 column 19 of). We also assume that at both the prevalence of disability and the mortality, we could have used more sophisticated methods to get the prevalence to single year from the age grouped data. For instance, by fitting a regression model in the five year age groups and using this to estimate the values of single age.

1. Disability-Free Life Expectancy (DFLE) is found by summing the person years lived at that age among those living with and without disability. To get the person years lived with disability (Table 15 column 11) we multiply the person years lived at that age column (7) by the proportion of people without disability at that age column (10). Since the Belgian survey had a complex design concluding the weighted rates, that is why prevalence rates adjusted for the design characteristics.

2. The total number of years lived without disability (column 12) are from column 11 in the same way as in paragraph 1 above.

3. disability (DFLE) at all age (column 13) is found in the same way as paragraph 3, from column 10 divided by column 14. Thus a woman aged 55 years in 2004 could expect to live 67 years of which 56 years (82.9%) would be free of disability.

Source: Calculation guide

Additional information on health expectancy can be found on the website of EHEMU, the international network on Health Expectancy and the Disability Process.
### Population data

#### Austria

<table>
<thead>
<tr>
<th>Year</th>
<th>Age</th>
<th>Number of men</th>
<th>Number of women</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>0</td>
<td>40543</td>
<td>44784</td>
<td>95327</td>
</tr>
<tr>
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<td>48418</td>
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<td>3</td>
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</tr>
<tr>
<td>1995</td>
<td>4</td>
<td>49481</td>
<td>45911</td>
<td>95392</td>
</tr>
<tr>
<td>1995</td>
<td>5</td>
<td>47996</td>
<td>45780</td>
<td>93776</td>
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### EHEMU Information System

**Life Table Series**

#### a. Population data
- [ ] Population estimates
- [ ] Death counts
- [ ] Birth counts

#### b. Life table series
- [ ] $e(x)$, life expectancy
- [ ] $q_x$, probability of dying
- [ ] $l_x$, number of survivors
- [ ] $d_x$, number of deaths
- [ ] Complete life tables

#### c. Health data
- [ ] Prevalence survey data
- [ ] Institutional population

#### d. Health expectancy
- [ ] Health expectancy
- [ ] Health to life expectancy ratio
- [ ] Complete health expectancy table

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#### Life Series Table

<table>
<thead>
<tr>
<th>Countries</th>
<th>Years</th>
<th>Ages</th>
<th>Sexes</th>
<th>Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1995</td>
<td>0</td>
<td>Men</td>
<td>EHEMU</td>
</tr>
<tr>
<td>Belgium</td>
<td>1996</td>
<td>75</td>
<td>Women</td>
<td>EHEMU</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>1997</td>
<td>65</td>
<td>Men</td>
<td>EHEMU</td>
</tr>
<tr>
<td>Cyprus</td>
<td>1998</td>
<td>80</td>
<td>Women</td>
<td>EHEMU</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1999</td>
<td>65</td>
<td>Men</td>
<td>EHEMU</td>
</tr>
<tr>
<td>Denmark</td>
<td>2000</td>
<td>65</td>
<td>Women</td>
<td>EHEMU</td>
</tr>
<tr>
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<td>65</td>
<td>Men</td>
<td>EHEMU</td>
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<td>Finland</td>
<td>2002</td>
<td>65</td>
<td>Women</td>
<td>EHEMU</td>
</tr>
<tr>
<td>France</td>
<td>2003</td>
<td>65</td>
<td>Men</td>
<td>EHEMU</td>
</tr>
<tr>
<td>Germany</td>
<td>2004</td>
<td>65</td>
<td>Women</td>
<td>EHEMU</td>
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<td>Greece</td>
<td></td>
<td></td>
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</tr>
</tbody>
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## Health Expectancies

### General Information

The EHEMU Database & Information System provides health expectancy data for various countries in Europe. The system allows users to select different health expectancy parameters and view data for specific years, ages, and sexes.

### Data Display

The interface includes a dropdown menu for selecting health expectancy parameters such as self-reported health, morbidity, and activity limitation. There is also a table showing health expectancy data for different countries, years, ages, and sexes.

### Example Data

- **Countries:** Austria, Belgium, Denmark, Estonia, Finland, France, Greece, Ireland, Italy
- **Years:** 2004
- **Ages:** 60, 85
- **Sexes:** Men, Women
- **Status:** Essentially EHEMU

### User Interface Elements

- **Select:** Button to select the desired parameter.
- **Clear:** Button to clear all selections.

### Acknowledgments

The EHEMU Database & Information System is supported by the Centre National de l'Enseignement Supérieur (CNES) and funded by DG SANCO.
### Health expectancies

#### Austria

<table>
<thead>
<tr>
<th>Age</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women</td>
<td>Men</td>
</tr>
<tr>
<td>16</td>
<td>11.30</td>
<td>8.40</td>
</tr>
<tr>
<td>35</td>
<td>10.00</td>
<td>8.70</td>
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<tr>
<td>65</td>
<td>8.00</td>
<td>4.50</td>
</tr>
<tr>
<td>75</td>
<td>5.25</td>
<td>3.40</td>
</tr>
<tr>
<td>85</td>
<td>1.75</td>
<td>1.00</td>
</tr>
</tbody>
</table>

#### EHEMU Information System

- Database & Information System
- Health expectancies

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**Confidence intervals**

Health expectancy: linear and non-linear at age under 60.

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**Table: Health expectancy**

- **Austria**
- **2006**
  - Women: 11.30, Men: 8.40
  - Women: 10.00, Men: 8.70
  - Women: 8.00, Men: 4.50
  - Women: 5.25, Men: 3.40
  - Women: 1.75, Men: 1.00

- **2007**
  - Women: 11.30, Men: 8.40
  - Women: 10.00, Men: 8.70
  - Women: 8.00, Men: 4.50
  - Women: 5.25, Men: 3.40
  - Women: 1.75, Men: 1.00
## Health Expectancies

### EHEMU Database & Information System

#### Health to Life Expectancy Ratio

- **Activity limitation:**
- **Health to Life Expectancy ratio:**

### Health Expectancy: Austria 2004: all ages/both sexes

<table>
<thead>
<tr>
<th>Age</th>
<th>Total LE</th>
<th>LE without activity limitation</th>
<th>LE with activity limitation</th>
<th>Health to Life Expectancy</th>
<th>LE with health limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>63.84</td>
<td>63.72</td>
<td>0.96</td>
<td>63.84</td>
<td>63.72</td>
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<tr>
<td>20</td>
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<td>67.01</td>
<td>0.99</td>
<td>67.14</td>
<td>67.01</td>
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<tr>
<td>50</td>
<td>72.42</td>
<td>72.29</td>
<td>0.98</td>
<td>72.42</td>
<td>72.29</td>
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<tr>
<td>80</td>
<td>76.69</td>
<td>76.56</td>
<td>0.98</td>
<td>76.69</td>
<td>76.56</td>
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<tr>
<td>100</td>
<td>80.36</td>
<td>80.24</td>
<td>0.99</td>
<td>80.36</td>
<td>80.24</td>
</tr>
</tbody>
</table>

### Austria 2004

- **Total LE:**
- **LE without activity limitation:**
- **LE with activity limitation:**
- **Health to Life Expectancy:**
- **LE with health limitation:**

**II - EHEMU Information System**

- **Population data**
  - Population estimates
  - Death counts
  - Birth rates

- **Life table series**
  - ex. life expectancy
  - sp. probability of dying
  - A. number of survivors
  - D. number of deaths

- **Health data**
  - Prevention (survey data)
  - Institutional population

- **Health expectancies**
  - Health expectancy
  - Health to life expectancy ratio
  - Complete health expectancy table

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