Disability-Free Life Expectancy (DFLE) in EU Countries from 1991 to 2003

Estimation based on European Community Household Panel (ECHP) waves 2 to 8 made to fulfil the requirements for Healthy Life Years to be an EU Structural Indicator

Jean-Marie Robine
Carol Jagger
Aurore Clavel
Isabelle Romieu

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The EHEMU team comprises

Jean-Marie Robine, Health and Demography, Université de Montpellier, robine@valdorel.fnclcc.fr
Carol Jagger, University of Leicester, cxj@leicester.ac.uk
Hermann van Oyen, Scientific Institute of Public Health, HVanOyen@iph.fgov.be
Emmanuelle Cambois, INED, Cambois@ined.fr
Isabelle Romieu, Health and Demography, Université de Montpellier, iromieu@valdorel.fnclcc.fr
Aurore Clavel, Health and Demography, Université de Montpellier, demosante3@valdorel.fnclcc.fr
Geraldine Barker, University of Leicester, gab7@leicester.ac.uk

Contact EHEMU: Isabelle Romieu
Equipe Démographie et Santé, Centre Val d'Aurelle, Parc Euromédecine, 34298 Montpellier cedex 5, France.
Tel: +33 (0) 467 61 30 27 - Fax: +33 (0) 467 61 30 47 - Email: iromieu@valdorel.fnclcc.fr

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Background

Disability-free life expectancy (DFLE) has been included in the list of new indicators to be developed to improve the set of EU Structural Indicators. DFLE has been selected to be the indicator of "Healthy Life Years" in the domain of Environment.

The Structural Indicators should cover all the EU Member States plus Iceland, Norway, the United States of America and Japan. Data sets should cover a 10-year period, beginning in 1990/91, up to the year for which the most recent data is available. This had to be *at least* 1997.

In the first assessment to be a structural indicator, DFLE was awarded a grade B. An indicator is graded "B" if:

- Data is available on time for the Spring Report of the year $_{t}$ for most Member States and at least most of the acceding countries.
- Data cover the years 1999 until at least the reference year $_{t-3}$.
- There are some serious shortcomings with regard to either comparability between Member States/Candidate Countries/US and Japan (including the lack of data) or break in series for several countries which seriously hamper comparison over time. Deficiencies with regard to assessing and documenting impact of these shortcomings might be identified.
- Data is collected from reliable sources applying high standards with regard to methodology/accuracy and is well documented in line with Eurostat metadata standard.

Currently DFLE computed in Europe using Eurostat data sources (ECHP) meets all the requirements for the 15 old Member States from 1994 to 2001. From a methodological point of view they are comparable to the series computed in the United States and in Japan, though as the data sources are different to those in the US and Japan the values are not directly comparable. There are however, currently no national series and/or data available within the new Member States for the same years. For 2002 and 2003, there is no European data available as the ECHP ended in 2001 and the survey that will replace the ECHP, the Survey of Income and Living Conditions (SILC), will not begin until 2004 in the old Member States and 2005 in the new ones, with pilots in 2003 in certain countries.

To become a structural indicator DFLE must attain ideally a grade AA. An indicator is graded "A" if:

- Data is available for Member States, at least acceding countries, US and Japan.
- Data cover the years 1999 until at least the reference year $_{t-2}$ (including estimates).
- The underlying data is collected on the basis of a common methodology for the European Union with the Candidate Countries following the same approach.
- Data for US and Japan can be considered comparable with any major differences being assessed and documented.
- Data are comparable over time; impact of procedural or conceptual changes being documented.

An "AA" is given if the indicator fulfils the requirements listed for the "A" grading and in addition:

- time series are available (starting from 1991 for the Member States and 1995 for the Candidate Countries) and
- data for at least reference year $_{t-2}$ (real data for a majority of countries) is available in time for the Spring Report.

Until now DFLE at the European level was computed using the ECHP from 1994 to 2001. Although all the criteria above can be met, albeit with some estimation via trend analysis, for the old Member States before 2004, the data to this point are not fully harmonised. Moreover we will not be able to include the new Member States before 2005, with the first wave of SILC in these countries. SILC is the new European panel study which will replace the ECHP, starting in 2004 in the old Member States. A major drawback with the ECHP is that the questions did not fully distinguish the different facets of health according to current views on the disablement process and health measurement. These issues are resolved in the health questions in SILC and moreover a more rigorous translation process to the underlying health concept will minimise cultural differences in the comprehension of the questions. Disruption of series of data on social statistics in EU because of the replacement of ECHP by SILC is unavoidable but SILC will clearly improve the indicators not least in terms of the comparability between and the coverage across countries. A further issue is that the panel design of the ECHP means that representativeness of the sample to the national populations decreases as the sample ages unless there is replenishment across the whole age range.

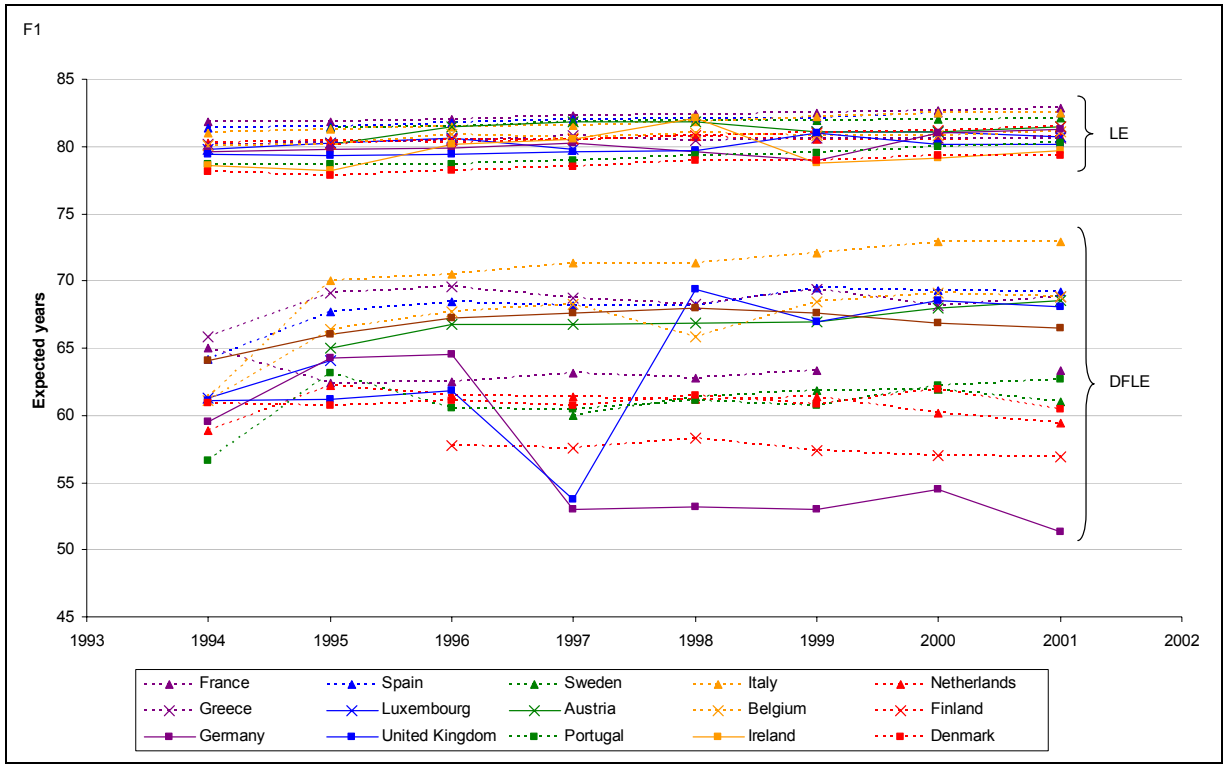
Using the ECHP series we can demonstrate that the criteria for grade A can be met for the old Member States from 1991 until 2003 and with the new series from SILC most of the criteria for grade AA will be met from 2004/5 for the 25 European Member States.

The European Health Expectancy Monitoring Unit (EHEMU) has been funded by the European Public Health Programme to monitor the lengthening of life and its relationship to healthy active life expectancy in Europe, covering the methodology, data quality and analysis as well as interpretation and dissemination. DFLE is one of the indicators developed by the Euro-REVES group and monitored by EHEMU. The EHEMU team therefore has all the necessary skills and expertise to provide the resources to Eurostat in is role of development of DFLE as a structural indicator.

Assessment of LE and DFLE calculation made by Eurostat

Life expectancy (LE) and Disability-free Life Expectancy (DFLE) calculations with ECHP data from 1994 (wave 1) to 2001 (wave 8) were made by Eurostat. An overview of the tables of the calculations is given graphically in Figure 1.

Figure 1: Female LE and DFLE at birth by country, 1994 – 2001



It is obvious from Figure 1 that:

- the DFLE in 1994 is lower than the trend for the rest of the series for all countries;
- there was a discontinuity in the trend of DFLE for the UK and Germany in 1997;
- there are some unexpected values for some countries that lie outside of the very regular trend of LE.

These three points are discussed further below beginning first with the problems with the LE values (since these must be corrected before DFLE is calculated).

a. Assessment of LE values

Figure 2 shows the trends in LE for females at birth in each of the 15 old Member States (MS) from 1994 to 2001. Whilst there is generally a steadily increasing trend in all MS, there are obvious unexpected fluctuations is five countries (Austria, Germany, Ireland, Luxembourg, United Kingdom) and shown by the solid lines. The small population size may explain some of the fluctuation in the trend for Luxembourg but this is not the case for the remaining four countries.

Figure 2: Female LE at birth by country, 1994-2001

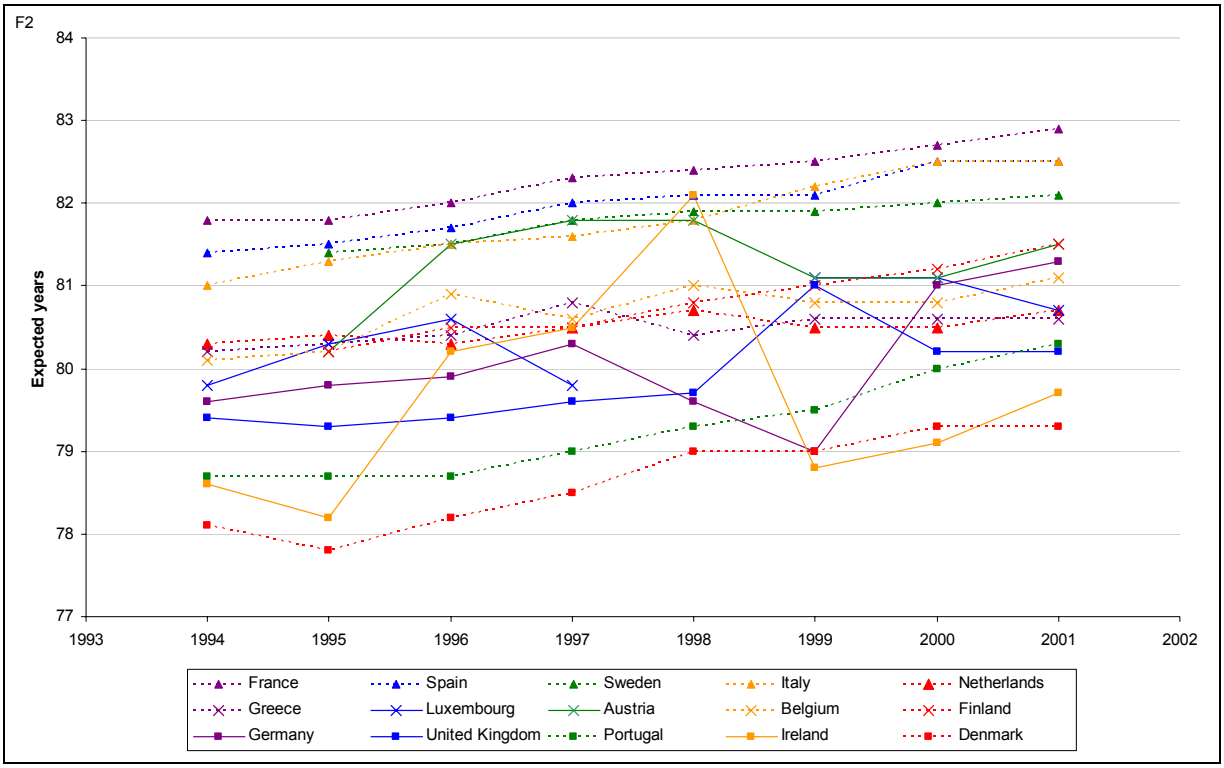


Figure 3 contrasts these four countries with two others who summarise the two main patterns observed: a steady increase over time with the country retaining its position in the middle of the distribution (Finland) or a stagnation (or very slight increase) with the country losing its position over the distribution (Netherlands). Compared to these two patterns, the trajectories observed in Austria, Germany, Ireland and the United Kingdom display aberrant values. For these four countries, the Eurostat LE values were checked against other international sources for LE (see Annex 2 for details of other data sources). We observed that the agreement between the WHO European Health for All database, the US Census Bureau International Data Base (IDB) and the Human Mortality Database (HMD) was high and the previously observed aberrant values were not confirmed by the other sources (Figure 4). In addition the aberrant values were always in the female LE at birth, confirming that these values are mistakes.

Conclusion: there appears to be values in the Eurostat dataset for female LE at birth that require correction before recalculating DFLE. If correction is impossible then the values should be replaced by another source, such as the U.S. Bureau of the Census.

Figure 3: Female LE at birth for 6 selected countries, 1994-2001

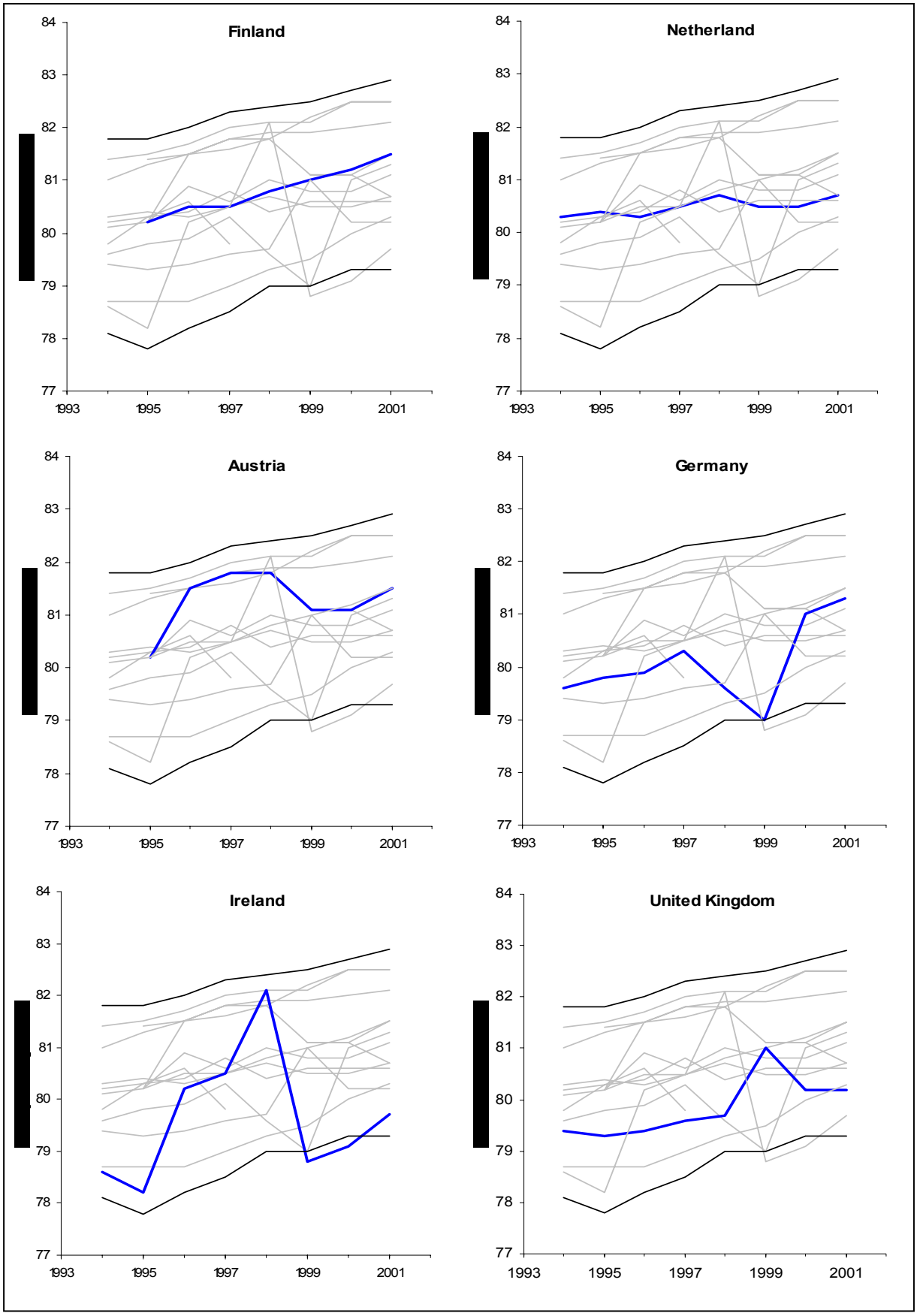
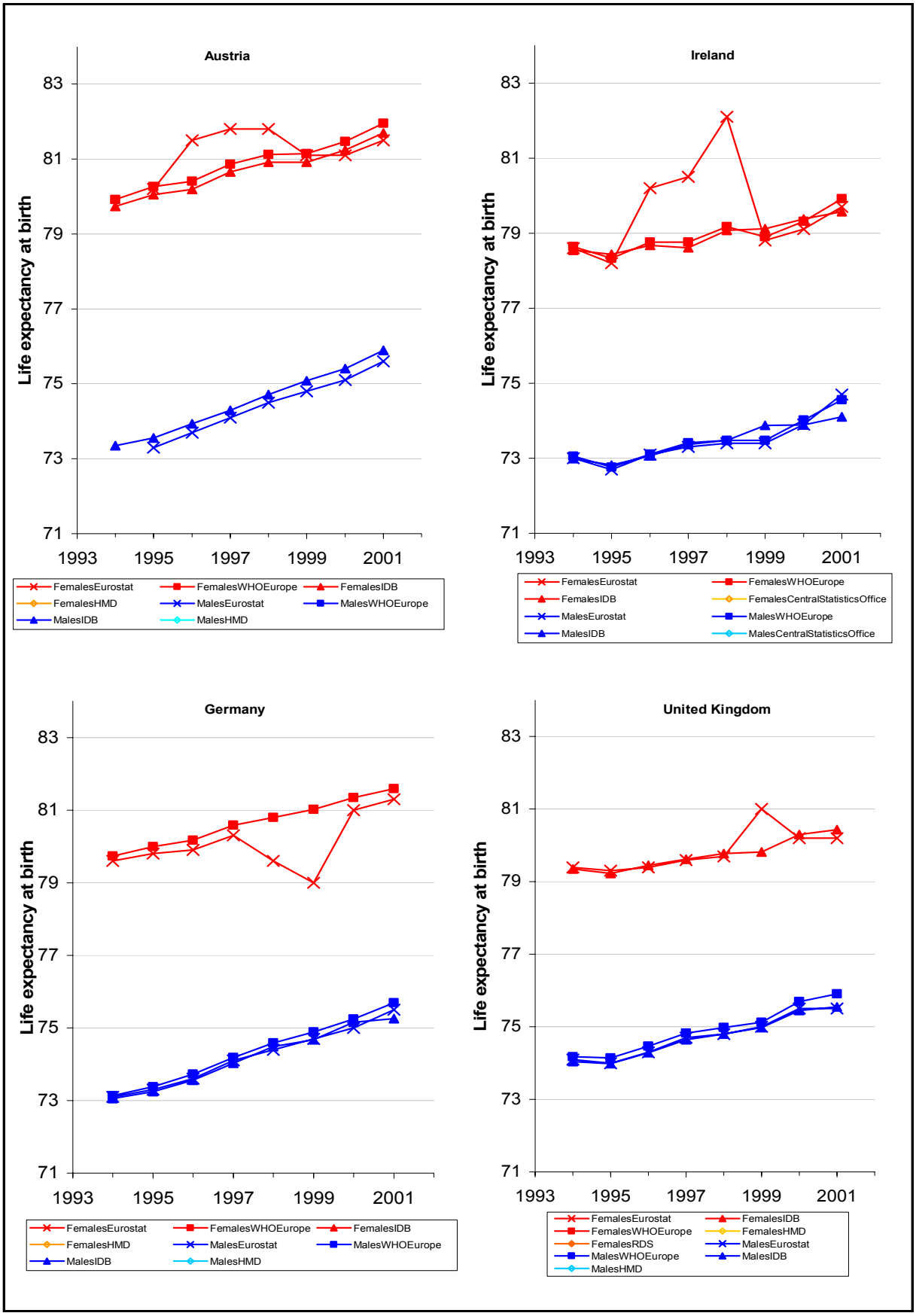


Figure 4: Female and male LE at birth for Austria, Ireland, Germany and the United Kingdom using different data sources, 1994-2001



b. Assessment of DFLE values

The low DFLE values observed for all countries in 1994 (wave1) in Figure 1 can be explained by the change in the questions between wave 1 and the following waves. In 1994 (wave 1) the ECHP used the question "Are you hampered in your daily activities by any physical or mental health problem, illness or disability?" (PH003A). From 1995 (wave 2) onwards ECHP replaced this question by the combination of two questions: PH002 "Do you have any chronic physical or mental health problem, illness or disability?" and question PH003 "Are you hampered in your daily activities by this physical or mental health problem, illness or disability?" This change to an initial screen is sufficient to explain a decrease in the prevalence of being hampered in daily life in 1995 and the later years, and therefore a sudden increase in DFLE over the value in 1994. Accordingly, in subsequent figures we ignore the data from 1994.

During the period 1995 to 2001, two countries, UK and Germany, changed their survey methodology in 1997 resulting in a disruption of the trend (Figures 5 and 6). After 1997 the ECHP was not run in these two countries but the ECHP data were produced from other existing national surveys; in the case of UK the British Household Panel Survey (BHPS).

Conclusions: for the UK extrapolate trend from 1998-2001 and for Germany extrapolate trend from 1997-2001 to produce estimates for 1995 and 1996 then adjust 1997-2001 values by the difference between ECHP 1995-6 values and the estimated values for 1995-6. For all countries ignore 1994 (wave 1) data. The results are shown in Figure 7.

Figure 5: Female DFLE at birth by country, 1995 – 2001

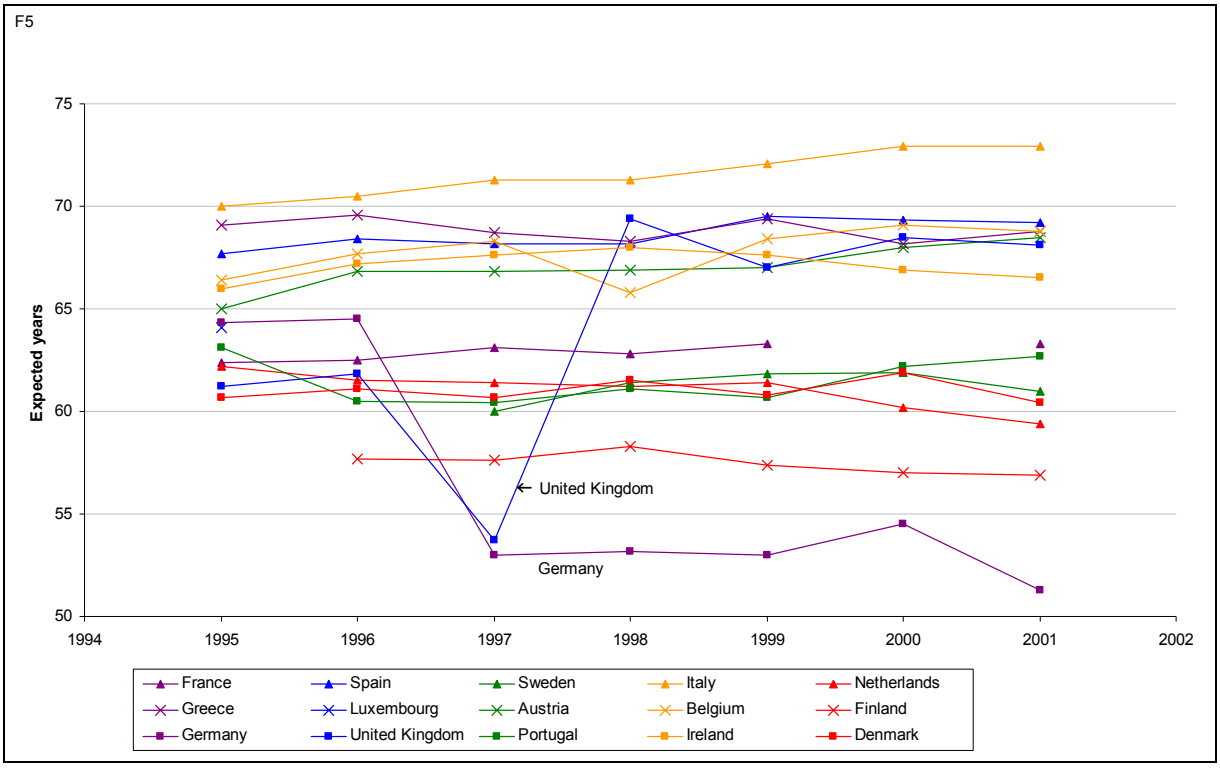


Figure 6: Female DFLE at birth UK and Germany, 1995 – 2001

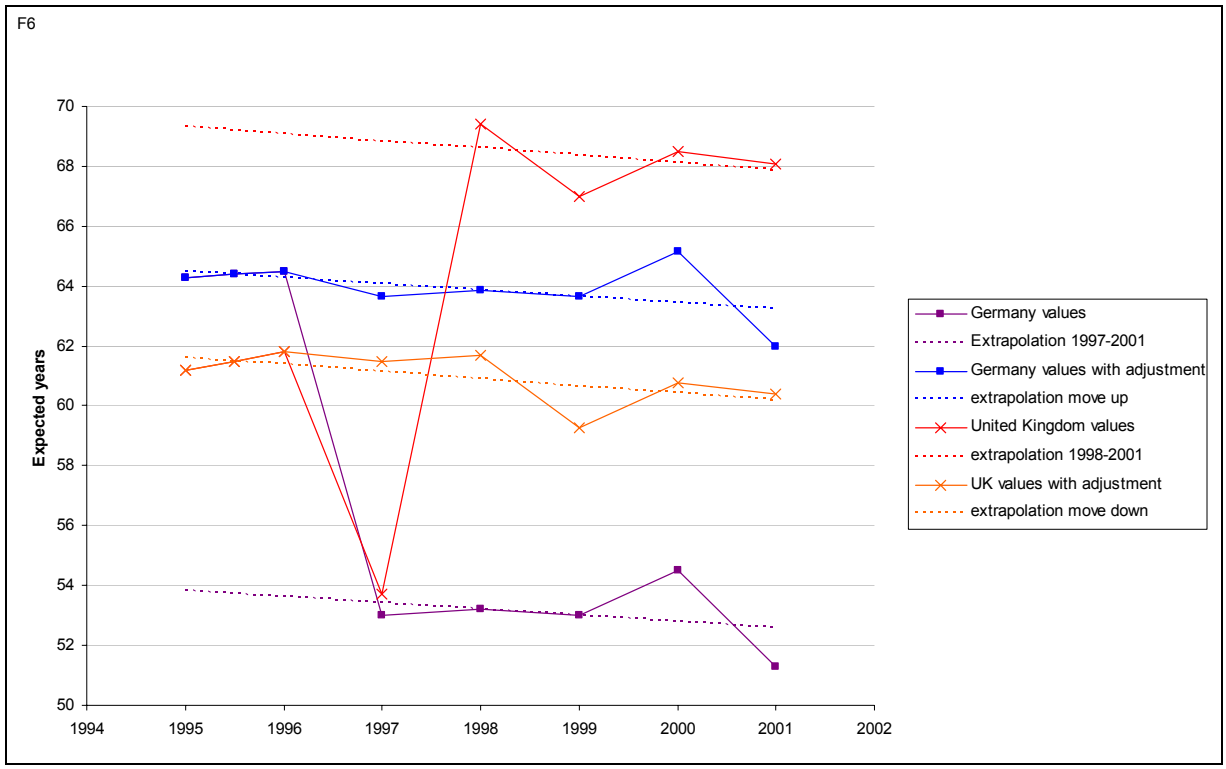
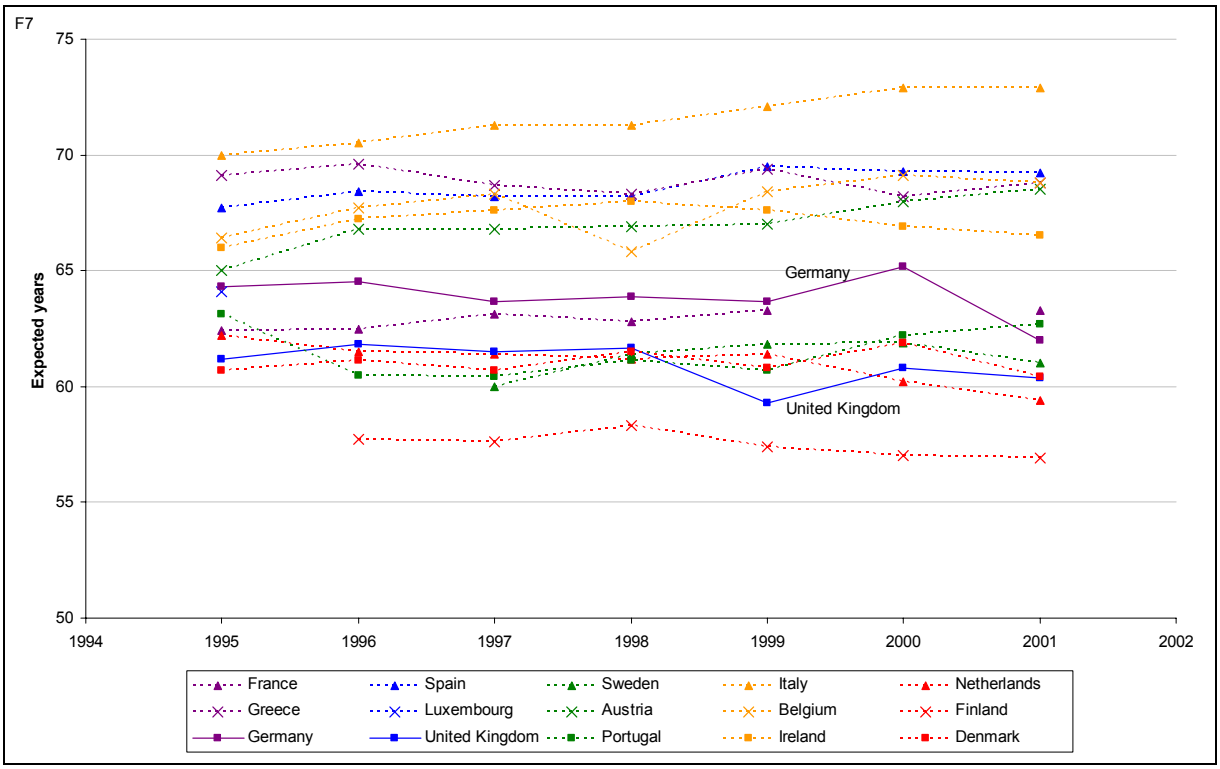


Figure 7: Female DFLE at birth by country, 1995 – 2001 with adjustment for UK and Germany



Assessment of Eurostat proposal to complete the series to 2003

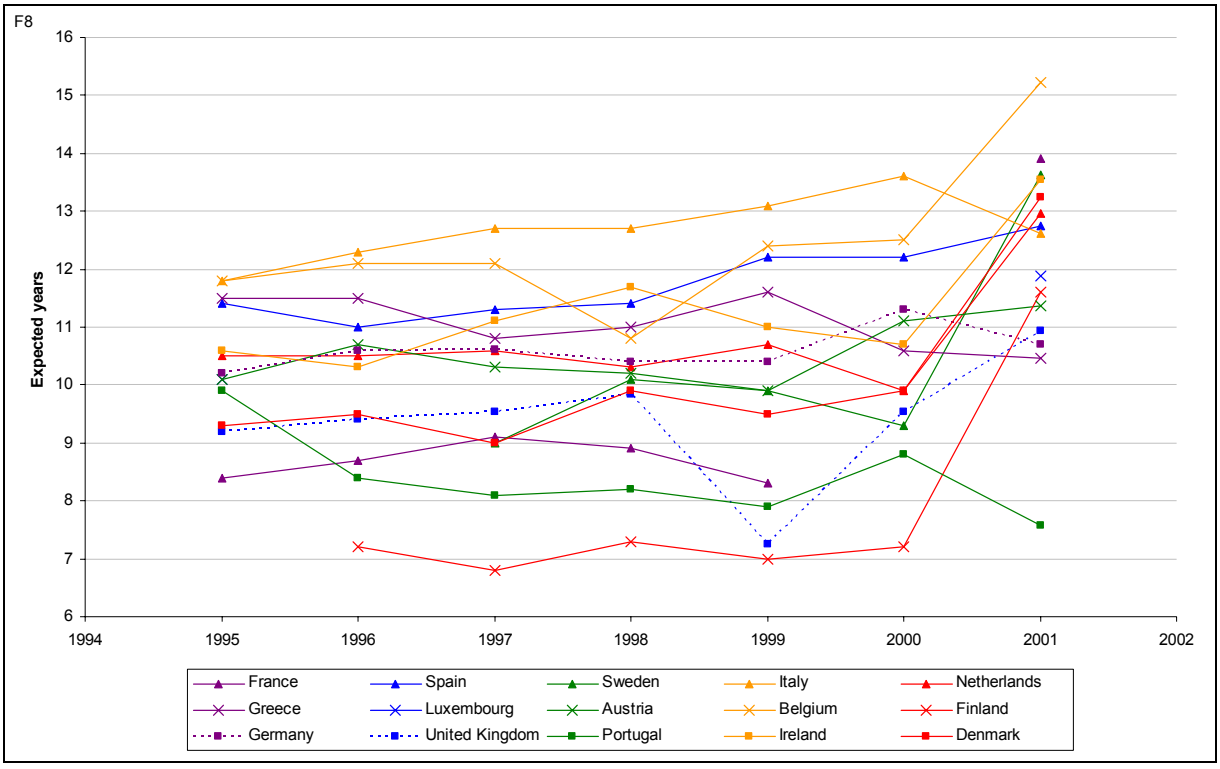
Eurostat proposed to complete the series with years 2002 to 2003 by using all the available means, that is:

- Computation using Eurobarometer data for 2002
- Existing calculations from individual countries for 2002 and 2003
- Existing datasets which could be used to make the calculations for 2002 and 2003
- Computation using the European Statistics on Income and Living Conditions (EU-SILC) pilot in 7 countries (Austria, Belgium, Denmark, Greece, Ireland, Luxembourg, Norway)

Using the Eurobarometer 58.2 for 2002{Jagger & Robine 2003 #35884} and by combining Question 29 "Do you have any long-standing illness or health problem?" (Yes) with Question 30 "For the past six months or more have you been restricted in doing certain activities because of health problems?" (Yes, severely restricted or yes, somewhat restricted) we can conceptually reconstruct the ECHP combination of question PH002 "Do you have any chronic physical or mental health problem, illness or disability?" (Yes) with question PH003 "Are you hampered in your daily activities by this physical or mental health problem, illness or disability?" (Yes, strongly limited or yes, limited).

We used this reconstruction to produce the prevalence of disability in 2002 from age 65 (since there are no values at birth from the Eurobarometer). As the life table for 2002 was missing for several EU countries, we used the LE from 2001 with the prevalence of disability from the Eurobarometer 2002 in order to compare the DFLE at age 65 for the ECHP and Eurobarometer questions (Figure 8).

Figure 8: Female DFLE at age 65 by country, 1995 – 2001 as Figure 7 together with Eurobarometer value for 2001



Overall the DFLE based on the Eurobarometer prevalence data identifies a similar number of years without disability suggesting that the combination of the two Eurobarometer questions tap the same health concept as the two questions in the ECHP. However, at the more detailed country level, the match between the ECHP values and those from the Eurobarometer are not perfect (Table 1).

Table 1: Differences in DFLE at age 65 in 2001 by ECHP and Eurobarometer, values and ranks

Countries	ECHP values extrapolated	Rank 1	Eurobarometer values	Rank 2	Difference in values	Difference in ranks
Finland	7.28	15	11.60	10	4.32	5.
Portugal	8.14	14	7.58	15	**0.57**	**1**
France	8.69	13	13.91	2	5.22	11
United Kingdom	8.98	12	10.94	12	1.96	**0**
Netherlands	9.87	11	12.96	6	3.09	5
Luxembourg	10.10	10	11.88	9	1.78	**1**
Denmark	10.13	9	13.25	5	3.12	4
Sweden	10.20	8	13.63	3	3.43	5
Greece	10.61	7	10.47	14	**0.15**	7
Germany	10.86	6	10.70	13	**0.15**	7
Ireland	11.01	5	13.54	4	2.52	**1**
Austria	11.14	4	11.37	11	**0.22**	7
Spain	12.26	3	12.75	7	**0.49**	4
Belgium	12.66	2	15.22	1	2.56	**1**
Italy	13.86	1	12.62	8	1.24	7

Table 1 shows that five countries, particularly those with more extreme values, retain their rank (or move rank by at most one). Moreover four countries, in the middle of the ranking, significantly change their rank although the actual values themselves remain almost the same. However, the remainder show more variability in their values and ranks. This suggests that the Eurobarometer could be used to replace the ECHP but only in nine countries.

The REVES database shows that there are no calculations available yet for the years 2002 or 2003 for any of the European countries (see list of references for published calculations by countries in Annex 1). Moreover the REVES network has no knowledge of unpublished 2002 or 2003 values despite an enquiry to REVES members from the EHEMU project. It seems unlikely that there are existing calculations by countries or existing national datasets (except probably for the Netherlands) in order to complete the series with 2002 or 2003 values.

With regard to computation using the SILC pilot for 2003, this can only be possible for the few countries (6 out of 25) who will take part in the pilot and therefore cannot completely fill the gap. In addition since the questions in SILC are identical to those used in the Eurobarometer, there may be differences identified in values as described above. Moreover the SILC questions have been translated with a different protocol to the Eurobarometer questions.

Conclusion: It would be impossible to complete the two missing years (2002 and 2003) by any combination of all available means without producing a very piecemeal solution. One simple method to fill the gaps in 2002 and 2003 is required.

Assessment of ECHP data

One possible reason why differences might exist in DFLE between countries is due to variable participation rates in the ECHP which provides the prevalence of disability. Although response rates in the ECHP at the beginning (1994) are comparable to those normally achieved in complex surveys (Table 2), there is some variability between countries with generally higher response rates in the south and a range from 36% (Luxembourg) to 90% (Greece).

Table 2: ECHP sample size per country and proportion of households responding

Country	Selected households (N)	Households completed (N)	Household completion rate (%)	Number of personal interviews completed
Finland	9239	7344	79.5	14333
Spain	7108*	7206	60.4	17908
Italy	7989	7115	89.1	17729
Netherlands	5926	5187	87.5	9407
Greece	6131	5523	90.1	12492
Luxembourg	2826	1011	35.8	2046
Belgium	4886	4192	85.8	8127
Germany	10572	5054	47.8	9920
United Kingdom	8104	5779	71.3	10517
Portugal	6238	4881	78.2	11622
Ireland	7252	4048	53.5	9905
Denmark	5500	3482	63.3	5903
Euro-12	**81771**	**60822**	**74.4**	**129877**

* + 4822 replacements
Source: [1, 4]

Table 3 shows the number of persons interviewed from 1994 (wave 1) to 1999 (wave 6) by country. On comparison of Tables 2 and 3, there are some inconsistencies found in the number of persons interviewed at wave 1 and these are shown in more detail in Table 4. Of particular note is Belgium with a difference of 1417 and Germany with a difference of 430 persons. Some explanation is required. Figure 9 and 10 display the trends in attrition rates graphically.

Conclusion: The response rates in the ECHP over the period 1995 to 1999 appear to be reasonable at over 70% for all but two countries (Ireland and Denmark). In the case of the United Kingdom the low response rate of 65% in 1996 may have contributed to the decision to run the ECHP concurrently with a national panel survey (BHPS). The ECHP appears to be a suitable data set but it is imperative that the correct weights that take into account non-response and household sampling are available to ensure unbiased estimates of the prevalence of disability and to take into account when calculating the confidence intervals of the DFLE.

Table 3: Attrition in ECHP from 1994 (wave 1) to 1999 (wave 6) by country

	1994	1995	1996	1997	1998	1999
France	14333	13306	13051	12143	11209	10682
Spain	17893	16263	15640	14819	13779	13104
Sweden				9597	9461	9314
Italy	17729	17780	17736	16594	15934	15401
Netherlands	9407	9151	9277	9089	8826	8917
Greece	12492	12271	11602	10968	9985	9574
Luxembourg	2046	1968	1915	5802	5410	5291
Austria		7437	7271	6999	6561	6246
Belgium	6710	6454	6145	5741	5339	5021
Finland			8173	8068	7381	7110
Germany	9490	9002	8746	12059	11562	11288
United Kingdom	10517	8386	6940	8865	8764	8601
Portugal	11621	11858	11702	11625	11412	11250
Ireland	9904	8531	7487	6868	6324	5451
Denmark	5903	5503	4994	4628	4187	3983

Source: [2]

Table 4: Number of interviewed persons in ECHP 1994 (wave 1) from two sources

	series 1	series 2	Difference between series 1 and 2
	1994	1994	
France	14333	14333	0
Spain	17908	17893	15
Sweden			0
Italy	17729	17729	0
Netherlands	9407	9407	0
Greece	12492	12492	0
Luxembourg	2046	2046	0
Austria			0
Belgium	8127	6710	1417
Finland			0
Germany	9920	9490	430
United Kingdom	10517	10517	0
Portugal	11622	11621	1
Ireland	9905	9904	1
Denmark	5903	5903	0

Source: [1, 2]

Figure 9: Number of persons interviewed in successive waves of ECHP by country, 1994 – 1999

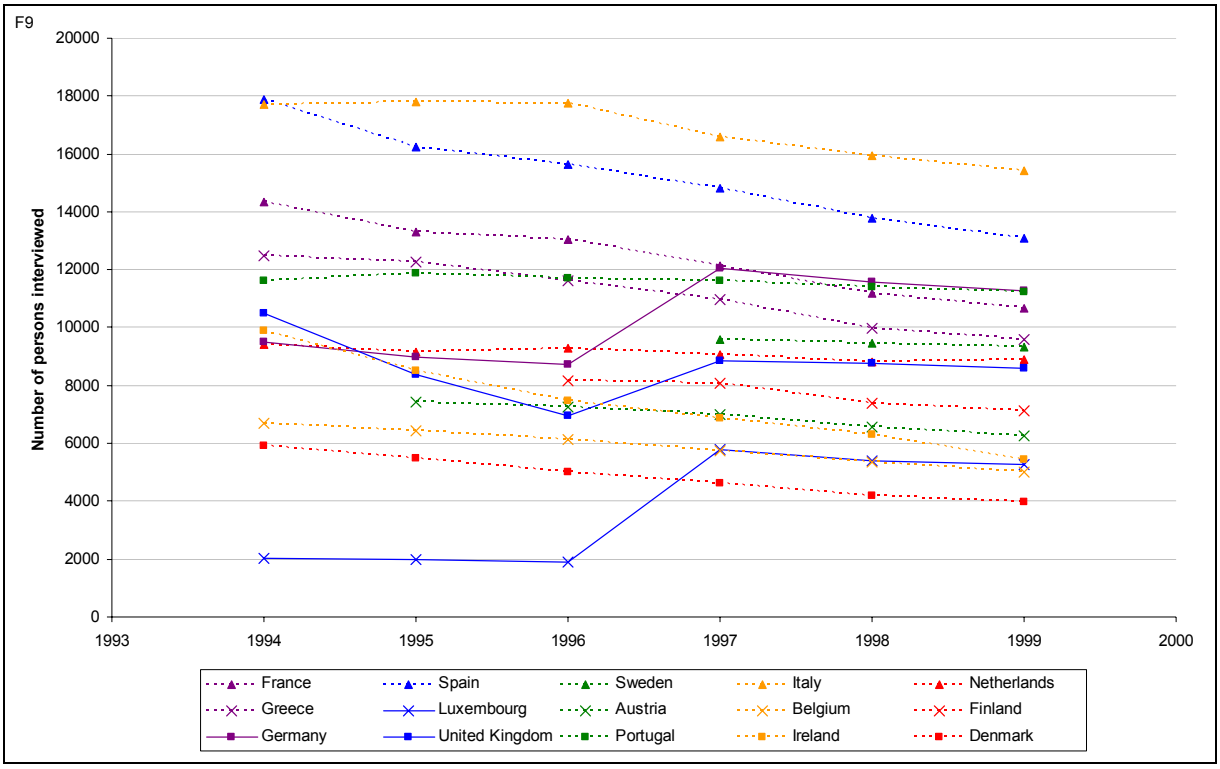
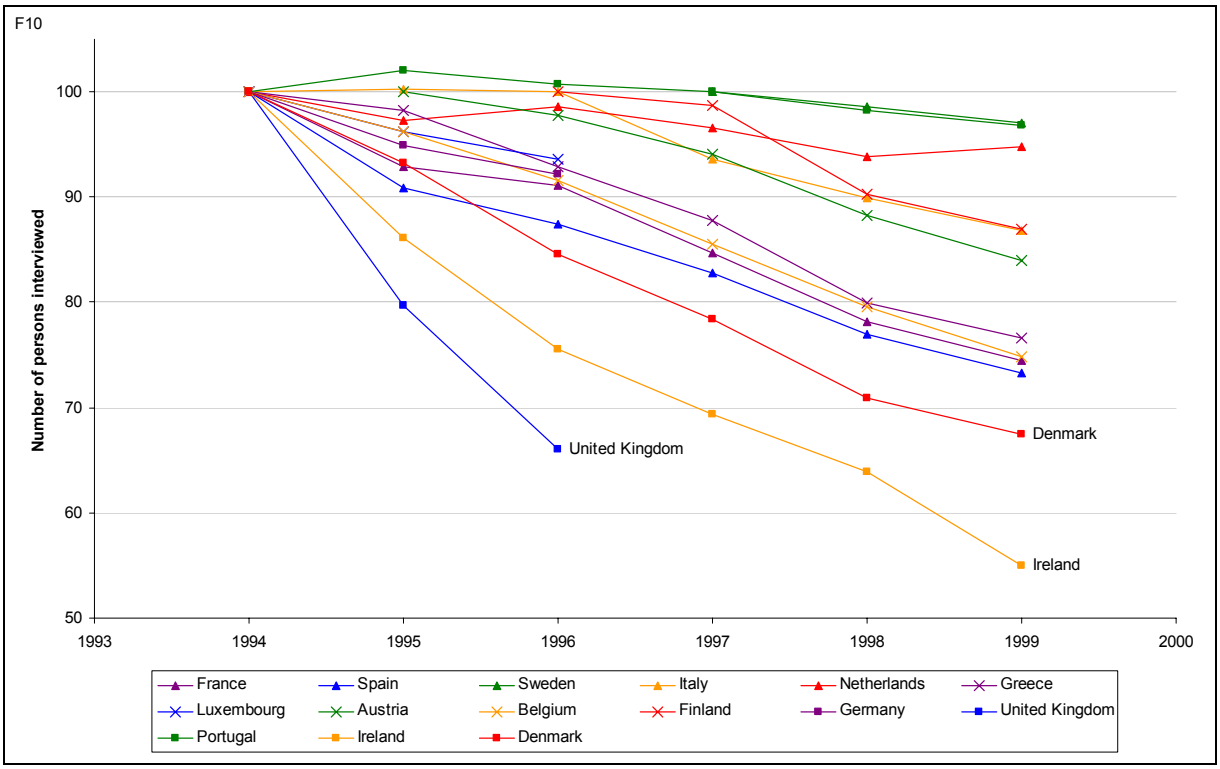


Figure 10: Number of persons interviewed in successive waves of ECHP as a percentage of value in 1994 (wave 1) by country, 1994 - 1999

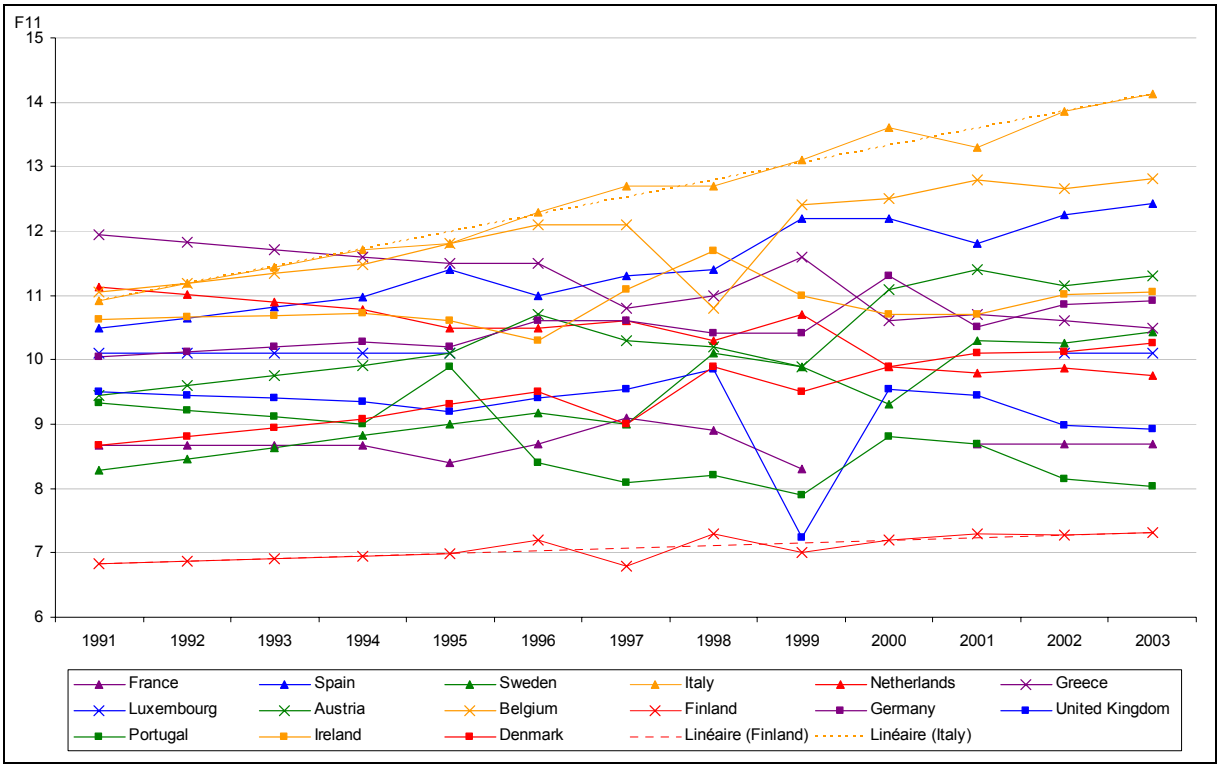


EHEMU proposal for a homogeneous series from 1991 to 2003

Taking into account the criteria required for a grade A as given in the background section together with the relative stability of DFLE produced by the ECHP, as analysed in the last section, we recommend extrapolation of the trends to provide estimates for the missing years. More detail is given below.

Values for the reference year $_{t-2}$ are required to meet the criteria for Grade A (thus up to and including 2003) with a starting year of 1991 in order to satisfy the criteria for AA. We have verified the relative stability of DFLE provided by the ECHP over the period 1995 to 2001 for each country, with small fluctuations and a monotone trend, if we take into account the adjustments made for disruption of the series in 1997 in the UK and Germany. We therefore suggest that the values for 1991-1994 and 2002-3 can be produced by extrapolation of the trend for each country over the period 1995-2001. The results are shown in Figure 11.

Figure 11: Female LE and DFLE at birth by country, 1991 – 2003 based on ECHP 1995-2001 with extrapolation



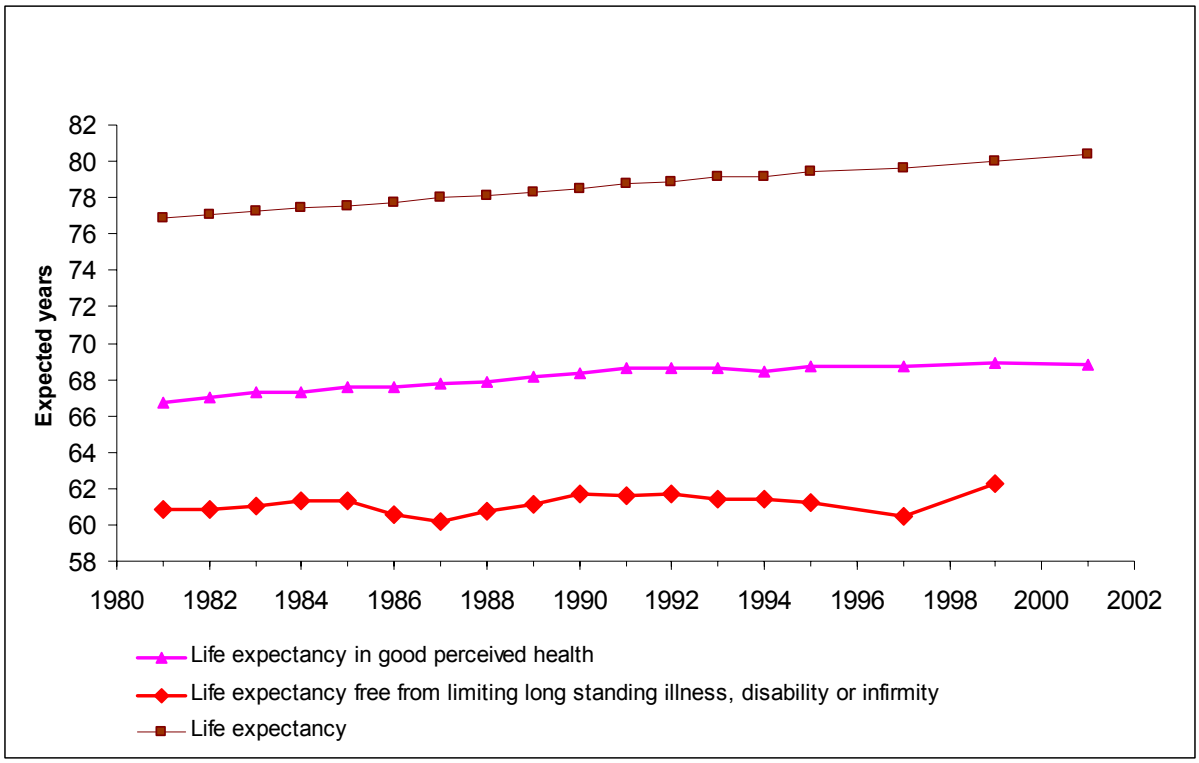
Repeating this work but replacing disability by self-perceived health (thereby moving from DFLE to LE in good perceived health), confirmed the same stability (TO BE COMPLETED LATER).

Figure 12: Female LE and LE in good perceived health at age 65 by country, 1991 – 2003 based on ECHP 1995-2001 with extrapolation

TO BE COMPLETED LATER

Existing series in countries provide confirmation of the extreme stability over the long term in DFLE and LE trends. For instance Figure 13 illustrates the case for the UK with LE free from limiting long standing illness, disability or infirmity, which is conceptually close to the ECHP indicator, from 1980 to 2001, encompassing all the time period of interest.

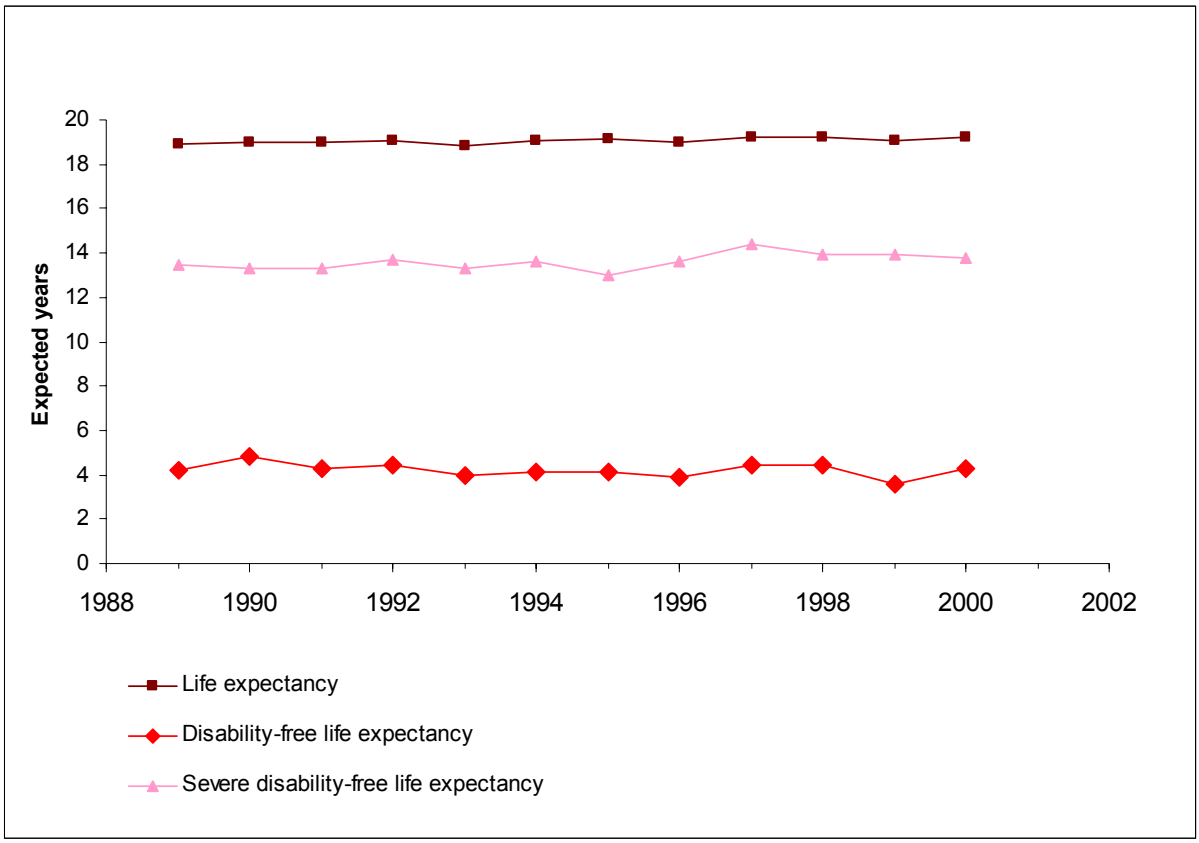
Figure 13: Female LE and DFLE at birth in United Kingdom, 1980 – 2001



Source: [5, 6, 7, 8]

Figure 14 illustrates the case for the Netherlands with LE free from vision, hearing and mobility disability.

Figure 14: Female LE, DFLE and severe DFLE at age 65 in the Netherlands, 1989 – 2000



Source: [9]

References

1. Eurostat. The European Community Household Panel (ECHP): Survey methodology and implementation Volume 1. 96. Eurostat.
2. Eurostat. The EC Household Panel "Newsletter" (01/02). 2003. Luxembourg, Office for Official Publications of the European Communities. Methods and Nomenclature.
3. Jagger, C and Robine, J-M. The health of adults in the European Union. 2003. Eurobarometer 58.2.
4. Robine J-M, Jagger C, Romieu I. Disability-free life expectancies in the European Union countries: calculation and comparisons. Genus 2001;LVII89-191.
5. Health expectancy: living longer, more years in poor health. In: UK National statistics; 2004. (http://www.statistics.gov.uk/cci/nugget.asp?id=918)
6. Report: healthy life expectancy in Great Britain, 1999. Health Statistics Quarterly 2002;15:60-63. (http://www.statistics.gov.uk/downloads/theme_health/HSQ15.pdf)
7. Kelly S, Baker A, Gupta S. Healthy life expectancy in Great Britain, 1980-96, and its use as an indicator in United Kingdom government strategies. Health Statistics Quarterly 2000;07:32-37.
8. Report: healthy life expectancy in Great Britain, 1997. Health Statistics Quarterly 2000;07:93-94.
9. Perenboom R, Van Herten L, Boshuizen H, Van Den Bos G. Trends in disability-free life expectancy. Disability and Rehabilitation 2004;26(7):377-386.

Annex 1: Reference for published calculations per country

Austria

1. Doblhammer G, Kytir J. Compression or expansion of morbidity? Trends in healthy-life expectancy in the elderly Austrian population between 1978 and 1998. Social Science and Medicine 2001;52:285-391.
2. Doblhammer G, Kytir J. Social Inequalities in Disability-free and healthy life expectancy in Austria. Wiener Klinishe Wochenschrift 1998;110(11).

Belgium

1. Bossuyt N, Gadeyne S, Deboosere P, Van Oyen H. Socio-economic inequalities in health expectancy in Belgium. Public Health 2004;118(1):3-10.
2. Van Oyen H, Bossuyt N, Deboosere P, Gadeyne S, Tafforeau J. Differences in health expectancy indicators in Belgium by region. APH 2002;60:341-362.
3. Miermans P-J, Van Oyen H. Rapport de Santé: Etude de la situation de la santé en Belgique sur la base des chiffres de la mortalité et de l'espérance de vie. Bruxelles: Institut Scientifique de la Santé Publique, Service d'épidémiologie; 2002. Report No.: IHE/EPI reports n° 2002-031.

Denmark

1. Bronnum-Hansen H. Disability-free life expectancy in Denmark. European Journal of Public Health 2004; In Press.
2. Bronnum-Hansen H, Juel K. Impact of smoking on the social gradient in health expectancy in Denmark. Journal of Epidemiology and Community Health 2004;58(7):604-610.
3. Bronnum-Hansen H, Davidsen M, Kjoller M. [Disability-free life expectancy among 60-year-olds in Denmark]. Ugeskr Laeger 2003;165(23):2395-2398.
4. Iburg K, Bronnum-Hansen H, Bjerregaard P. Health Expectancy in Greenland. Scandinavian Journal of Public Health 2001;29.
5. Bronnum-Hansen H, Juel K. Abstention from smoking extends life and compresses morbidity: a population based study of health expectancy among smokers and never smokers in Denmark. Tobacco Control 2001;10(3).
6. Bronnum-Hansen H. Socioeconomic differences in health expectancy in Denmark. Scandinavian Journal of Public Health 2000;28(3):194-199.

Finland

1. Sihvonen A, Kunst A, Lahelma E, Valkonen T, Mackenbach J. Socioeconomic inequalities in healh expectancy in Finland and Norway in the late 1980s. Social Science and Medicine 1998;47(3):303-315.

France

1. Cambois E, Robine J-M, Hayward M. Social inequalities in disability-free life expectancy in the French male population, 1980-1991. Demography 2001;38(4).
2. Cambois E, Robine J-M. Inégalités sociales d'espérance de vie sans incapacité en France: résultats et points de méthodologie. Médecine /Sciences 2000;16(11).
3. Robine J-M, Mormiche P, Sermet C. Examination of the causes and mechanisms of the increase in disability-free life expectancy. Journal of Aging and Health 1998;10(2, special issue).

Germany

1. Bruckner G. Health expectancy in Germany: What do we learn from the reunification process? Tokyo: NUPRI; 2001.
2. Klein T, Unger R. Aktive Lebenserwartung in der Bundesrepublik. Gesundheitswesen 1999;61(4):168-178.

Italy

1. Burgio A, Buratta V. New elderly, new data needs: the emergencies of statistical data on healthy aging. In: 18th CEIES Seminar: Active ageing statistics: The Hague, 23-24 May 2002. Luxembourg: Office for Official Publications of the European Commission; 2002. p. 63-69.

Portugal

1. Instituto Nacional de Estatistica, editor. Esperanças de vida sem incapacidade fisica de longa duraçao: Portugal continental: 1995-1996. Lisboa: INE; 2000.

Spain

1. Martinez-Sanchez E, Gutierrez Fisac J, Gispert R, Regidor E. Educational differences in health expectancy in Madrid and Barcelona. Health Policy 2001;55.
2. Gispert R, Puig X, Del Mar Torné M, Puigdefabrégas A. Esperança de vida en bona salut. Catalunya, 1986-1997. Butlleti Epidemiologic de Catalunya 2001;XXII(11):143-148.
3. Gutierrez Fisac J-L, Gispert R, Sola J. Factors explaining the geographical differences in disability-free life expectancy in Spain. Journal of Epidemiology and Community Health 2000;54.
4. Gispert R, Ritchie K, Rajmil L, Rue M, Gluting J, Roset M. Mental health expectancy: an indicator to bridge the gap between clinical and public health perspectives of population mental health. Acta Psychiatrica Scandinavia 1998;98(3):182-186.

The Netherlands

1. Perenboom J, Van Herten L, Boshuizen H, Van Den Bos G. Trends in health expectancy in wellbeing. Social Indicators Research 2004;65:227-244.
2. Perenboom R, Van Herten L, Boshuizen H, Van Den Bos G. Trends in disability-free life

expectancy. Disability and Rehabilitation 2004;26(7):377-386.

3. Nusselder W, Looman C. Decomposition of differences in health expectancy by cause. Demography 2004;41(2):315-334.
4. Perenboom R. Health expectancies and the International Classification of Functioning, Disability and Health (ICF). In: World Health Organisation, editor. Meeting of the WHO collaborating centers for the family of international classifications; Cologne, Germany; 2003.
5. Portrait F, Lindeboom M, Deeg D. Life expectancies in specific health states: results from a joint model of health status and mortality of older persons. Demography 2001;38(4).
6. Nusselder W, Looman C, Marang-Van De Mheen P, Van De Mheen H, Mackenbach J. Smoking and the compression of morbidity. Journal of Epidemiology and Community Health 2000;54.
7. Barendregt J, Bonneux L, Van Der Maas P. Health expectancy: from a population health indicator to a tool for policy making. Journal of Aging and Health 1998;10(2, special issue).

United Kingdom

1. Health expectancy: living longer, more years in poor health. In: UK National statistics; 2004. (http://www.statistics.gov.uk/cci/nugget.asp?id=918)
2. Bissett B. Healthy life expectancy in England at subnational level. Health Statistics Quarterly 2002;14:21-29.
3. Bajekal M, Purdon S, Woodgate-Jones G, Davies A. Healthy life expectancy at health authority level: comparing estimates from General Household Survey and the Health Survey for England. Health Statistics Quarterly 2002;16:25-37.
4. Report: healthy life expectancy in Great Britain, 1999. Health Statistics Quarterly 2002;15:60-63.
5. Sauvaget C, Jagger C, Arthur A. Active and cognitive impairment-free life expectancies: results from the Melton Mowbray 75+ health checks. Age and Ageing 2001;30.
6. Brayne C, Matthews F, Mcgee M, Jagger C. Health and ill-health in the older population in England and Wales: The Medical Research Council Cognitive Function and Ageing Study (MRC CFAS). Age and Ageing 2001;30:53-62.
7. Melzer D, McWilliams B, Brayne C, Johnson T, Bond J. Socioeconomic status and the expectation of disability in old age: estimates for England. Journal of Epidemiology and Community Health 2000;54(4):286-292.
8. Kelly S, Baker A, Gupta S. Healthy life expectancy in Great Britain, 1980-96, and its use as an indicator in United Kingdom government strategies. Health Statistics Quarterly 2000;07:32-37.
9. Report: healthy life expectancy in Great Britain, 1997. Health Statistics Quarterly 2000;07:93-94.
10. Waidmann T, Manton K. International evidence on disability trends among the elderly. Washington, DC: U.S. Department of Health and Human Services; 1998.
11. Waidmann T, Manton K. Evidence internationale des tendances d'incapacités chez les personnes âgées. Washington, DC: U.S. Department of Health and Human Services; 1998.
12. Jagger C, Raymond N, Morgan K. Planning for the future: The effect of changing mortality

incidence and recovery rates on life expectancy with visual disability. Journal of Aging and Health 1998;10(2, special issue).

13. Bone M, Bebbington A, Nicolaas G. Policy applications of health expectancy. Journal of Aging and Health 1998;10(2, special issue).

Annex 2: List of data sources for life expectancies

1. The Human Mortality Database (HMD):
   http://www.mortality.org/

2. Census Bureau International Data Base (IDB):
   http://www.census.gov/ipc/www/idbnew.html

3. World Health Organization Regional Office of Europe (WHO Europe):
   http://hfadb.who.dk/hfa/

4. World Health Organization Statistical Information System (WHOSIS):
   http://www-depdb.iarc.fr/who/menu.htm

5. Population Reference Bureau (PRB):
   http://www.prb.org/template.cfm?Section=AboutPRB

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