

# Inequalities in health expectancies at older ages in the European Union: findings from the Survey of Health and Retirement in Europe



24/06/09

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EHLEIS project co-funded by DG SANCO (Agreement number 2006109).

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## **Summary**

### **Background**

Substantial inequalities in Healthy Life Years (HLY) have been demonstrated between the 25 countries of the European Union. This article reports inequalities in a range of health expectancies, including HLY and measures that span the disablement process, at older ages in Europe, specifically investigating whether those countries with the highest life expectancies spend the extra years in better health.

### **Methods**

Data from the 2004 Survey of Health and Retirement in Europe (SHARE) was used to calculate health expectancies at age 50 by gender for each of the 11 countries using the Sullivan method. Measures used for the health states were chronic morbidity, physical functional limitations, the global activity limitation indicator (GALI) instrumental and basic self-care activities of activities of daily living score and self-perceived health.

Groupings of countries on the full range of health expectancies were explored through hierarchical cluster analysis.

### **Findings**

There was a three year difference in life expectancy at age 50 for men in 2004 between the 11 countries and a difference of 3.7 years for women. Despite their longer total life expectancy, women in all countries spent more years with ill-health whatever the definition of health used. Countries clustered into four distinct groups: Switzerland, with the highest health expectancies at age 50; Greece with a high proportion of LE free of activity restriction but a low proportion free of physical functional limitations; Italy,

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France and Spain with the highest LE at age 50 for women but a low proportion of remaining life free of morbidity, free of ADL restriction and a low proportion of remaining life in good health; and the remaining countries. (Austria, Belgium, Denmark, Germany, the Netherlands and Sweden) were characterized by having the lowest LE at age 50 for men and a low proportion of remaining life free of activity restriction.

### **Interpretation**

There are wide inequalities in the full range of health expectancies within European countries. However in some countries health expectancies suggest differing progression through the disablement process with more than average years with functional limitations which are not reflected in more years with activity restriction. Further exploration of individual, social and environmental policies that result in these findings is required.

## **Introduction**

Inequalities in life expectancy (LE) amongst European countries have been evident for some time, the major gaps being between the established EU countries (EU15) and the more recent EU members from Eastern European (1). However mortality rates and life expectancy are only indirect measures of the health of populations. With the advent of a new EU structural indicator on health, Healthy Life Years (HLY) it has been possible to demonstrate even greater inequalities in HLY than in LE across Europe of 14.5 years for men and 13.7 years for women at age 50 between the EU25 countries(2). Furthermore countries with the longest LE were not necessarily those with the greatest HLY suggesting that longer life and better health, indicative of compression of morbidity(3, 4), may not be universal.

HLY is a health expectancy based on a global activity limitation question, known as the GALI, one of three global health measures in the EU Statistics of Income and Living Conditions survey (EU-SILC). Though global measures have a utility in terms of encapsulating differences between countries, more detailed measures are then necessary to determine where differences lie. Since the GALI is a measure of activity limitation, the most appropriate framework for drilling down to more detailed measures is the disablement process(5, 6). Models of the disablement process identify disease or pathology as the initiating event, with a resulting limitation in body functions (physical, sensory or cognitive) which combine to produce restriction in instrumental activities of daily living (IADL) and basic personal care activities (ADLs). The presence of functional limitations is a strong predictor of future activity restrictions and may therefore indicate "preclinical disability" (7). Passage between these stages may vary due to factors external to the individual (including environmental, medical treatments and interventions) as well as inter-individual factors (lifestyle and behaviour changes, reducing the frequency of activities or adopting coping mechanisms)(5).

Although disability-free life expectancies based on ADLs and IADLs have been calculated for a number of countries, there has been little harmonisation, making

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comparisons difficult (8). An exception is the Cross-national determinants of Quality of Life and Health Services for the Elderly (CLESA) which compared disability free life expectancy (DFLE) in five European countries but data was harmonised post collection and covered differing periods in each country(9). Moreover health expectancies based on stages earlier in the disablement process are rare.

That different measures reflect different levels of ill-health/disability is not surprising but a comparison of a range of comparable health expectancies across countries may further elucidate the relationship between lengthening of life and health. The GALI, on which the HLY indicator is based, was included in the Survey of Health and Retirement in Europe (SHARE) alongside a wide range of other health measures. SHARE was first conducted in 2004 on individuals aged 50 years and over in 11 European countries: Germany, Austria, Belgium, Denmark, Spain, France, Greece, Italy, Netherlands, Sweden and Switzerland. This paper uses SHARE wave 1 to evaluate inequalities in a range of health expectancies, including HLY and measures that span the disablement process, at older ages in Europe, specifically investigating whether those countries with the highest life expectancies spend the extra years in better health.

## **Methods**

Health expectancies require data on mortality in the form of life tables and the age and sex specific prevalence of health states. We used individual country life tables for 2004 (the date of the SHARE survey) from the European Health Expectancy Monitoring Unit (EHEMU website ([www.ehemu.eu](http://www.ehemu.eu))). For the health data we used SHARE wave 1 release 2.01 (downloaded 02/03/09). The sample size for SHARE ranged from 2000 to 3000 persons per participating country, representing the non-institutionalized population aged 50 and older(10).

The SHARE main questionnaire consists of 20 modules (supplemented by a self-completion questionnaire). The detailed health measures on which health expectancies were based included chronic morbidity, physical functional limitations, the global activity limitation indicator (GALI) instrumental and basic self-care activities of activities of daily living score and self-perceived health. Further details of these measures are given in Appendix 1.

### ***Statistical methods***

Initial comparison of the health measure between the 11 countries was by means of the prevalence of each of the measures, standardised to the European standard population. Health expectancies were calculated using the Sullivan method (11, 12). We calculated several health expectancies: life expectancy free of chronic morbidity (DisFLE), life expectancy without physical functional limitations (LE without PFL), Healthy Life Years (HLY) based on the GALI question, life expectancy without IADL restriction (LE without IADL), life expectancy without ADL restriction (LE without ADL and life expectancy in good perceived health. To take into account the population living in institutions, excluded from general population surveys such as SHARE, we assumed that the prevalence of health states outside and within institutions does not differ(11).

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Hierarchical cluster analysis was used to explore similar groupings of the countries on all the health expectancies, entering the proportion of life expectancy spent with each health measure (transformed into Z scores) for men and women together.

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## **Results**

The mean age of the study population in each country ranged from 63.8 years in the Netherlands to 66.8 years in Spain (Table 1). There was a slight majority of females in all countries, from 52.6% of the population in Switzerland to 58.2% in Spain. Male life expectancy at age 50 in 2004 ranged from 27.9 years in Denmark to 30.9 years in Switzerland and female LE from 31.8 years in Denmark to 35.5 years in France.

Switzerland had the lowest standardized (to the European standard population) prevalence of ill-health for five of the six measures, the exception being the GALI, whilst Spain had the highest standardized prevalence for four measures (morbidity, PFL, IADL, SPH).

### ***Life and health expectancies***

There was a three year difference in life expectancy at age 50 for men in 2004 between the 11 countries and a difference of 3.7 years for women. Despite their longer total life expectancy, women in all countries spent more years with ill-health whatever the definition of health used (Figures 1-6). For each definition of health, we plotted the health expectancies for the 11 countries by decreasing life expectancy and with years of ill-health in the lower portion of the bars. Life expectancy with severe morbidity (three or more chronic condition) at age 50 was shortest in Switzerland (men: 3.8 years, women: 4.7 years) and highest in Spain (men: 7.3 years, women: 11.8 years) (Figure 1). When moderate morbidity included (1-2 chronic condition) Switzerland remained the lowest and Spain the highest. Life expectancy with physical functional limitations (PFL) also showed little relationship to overall life expectancy at age 50 with Switzerland again having the lowest life expectancy with PFL (men: 10.0 years, women: 18.0 years) (Figure 2). The highest number of years at age 50 with PFL differed between men and women; Denmark had the highest LE with PFL of 14.1 years whilst Spain had the highest for women (23.9 years).

In the majority of countries years free of activity restriction (HLU) at age 50 for men were similar to years free of PFL but for women HLY were uniformly higher than years free of PFL (Figure 3). In most countries years with severe activity limitation formed the smaller part of years with activity restriction, apart from men in France and both men and women in the Netherlands where the number of years with moderate and severe activity limitation were almost identical.

LE with IADL and ADL restrictions were much smaller than those based on other measures, reflecting their greater severity. However, though a large number of countries had similar levels, the range of years with IADL and ADL restrictions were considerable. LE with IADL restrictions at age 50 was again lowest in Switzerland (men: 1.9 years, women: 4.8 years) and highest in Spain (men: 5.9 years, women: 11.4 years) (Figure 4) and the same countries spanned the years with ADL restriction for women (Switzerland: 3.4 years, Spain: 6.5 years) (Figure 5). For men, LE with ADL restrictions was lowest in Switzerland (1.9 years) and highest in France (4.2 years).

Finally the more global health question of self-perceived health again reflected the variability and range in the other measures of functioning and disability. Switzerland had very low years in either poor or fair perceived health whilst Italy, Spain and Germany had the highest (Figure 6). This was particularly noticeable in women where France, Switzerland, Italy and Spain had almost identical life expectancies at age 50 of around 35 years whilst years in bad health ranged from 1.4 years in Switzerland to 7.5 years in Spain and years in not good (bad or fair) health ranged from 8.1 years in Switzerland to 20.4 in Italy. Over all the measures women spent more years with reduced function and ill-health than men. In addition there was little indication that those countries with the longest life expectancies had either the fewest years with ill-health or the most years without.

Results of the cluster analysis of countries on the proportion of remaining life free of limitations and disability are shown in Table 3. Four groups of countries were identified:

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Switzerland; Greece; Italy, France and Spain; and the remaining countries. Switzerland had the highest values for all measures apart from the proportion of life free of activity restriction. Greece had a high proportion of LE free of activity restriction but a low proportion free of PFL. France, Italy and Spain had the highest LE at age 50 for women but low proportions of remaining life free of morbidity, free of ADL restriction and a low proportion of remaining life in good health. The remaining countries (Austria, Belgium, Denmark, Germany, the Netherlands and Sweden) were characterized by having the lowest LE at age 50 for men and low proportions of remaining life free of activity restriction.

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## Discussion

To be completed

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## Acknowledgements

The SHARE data collection has been primarily funded by the European Commission through the 5th framework programme (project QLK6-CT-2001-00360 in the thematic

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programme Quality of Life). Additional funding came from the US National Institute on Aging (U01 AG09740-13S2, P01 AG005842, P01 AG08291, P30 AG12815, Y1-AG-4553-01 and OGHA 04-064). Data collection in Austria (through the Austrian Science Fund, FWF), Belgium (through the Belgian Science Policy Office) and Switzerland (through BBW/OFES/UFES) was nationally funded.

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**Table 1: Characteristics of the SHARE population aged 50 years and over, by country**

	Sample size	Mean age (SD)	% Male	Life expectancy at age 50	
				Men	Women
<b>Austria</b>	1849	65.4 (9.7)	42.0	28.9	33.5
<b>Belgium</b>	3013	65.1 (10.3)	46.9	28.3	33.0
<b>Denmark</b>	1615	64.6 (10.7)	46.9	27.9	31.8
<b>France</b>	1714	64.6 (10.6)	44.9	29.6	35.5
<b>Germany</b>	2305	64.5 (9.6)	47.0	28.8	33.4
<b>Greece</b>	1972	64.9 (10.6)	45.4	29.2	32.7
<b>Italy</b>	1996	64.8 (9.0)	45.2	30.1	35.1
<b>Netherlands</b>	2295	63.8 (9.9)	46.8	28.9	33.1
<b>Spain</b>	1804	66.8 (10.7)	41.8	29.5	35.2
<b>Sweden</b>	2595	65.2 (10.3)	47.1	30.3	34.1
<b>Switzerland</b>	962	65.1 (10.7)	47.4	30.9	35.2

**Table 2: Standardised\* prevalence (%) of health conditions in the SHARE population aged 50 years and over, by country  
(95% confidence intervals in parentheses)**

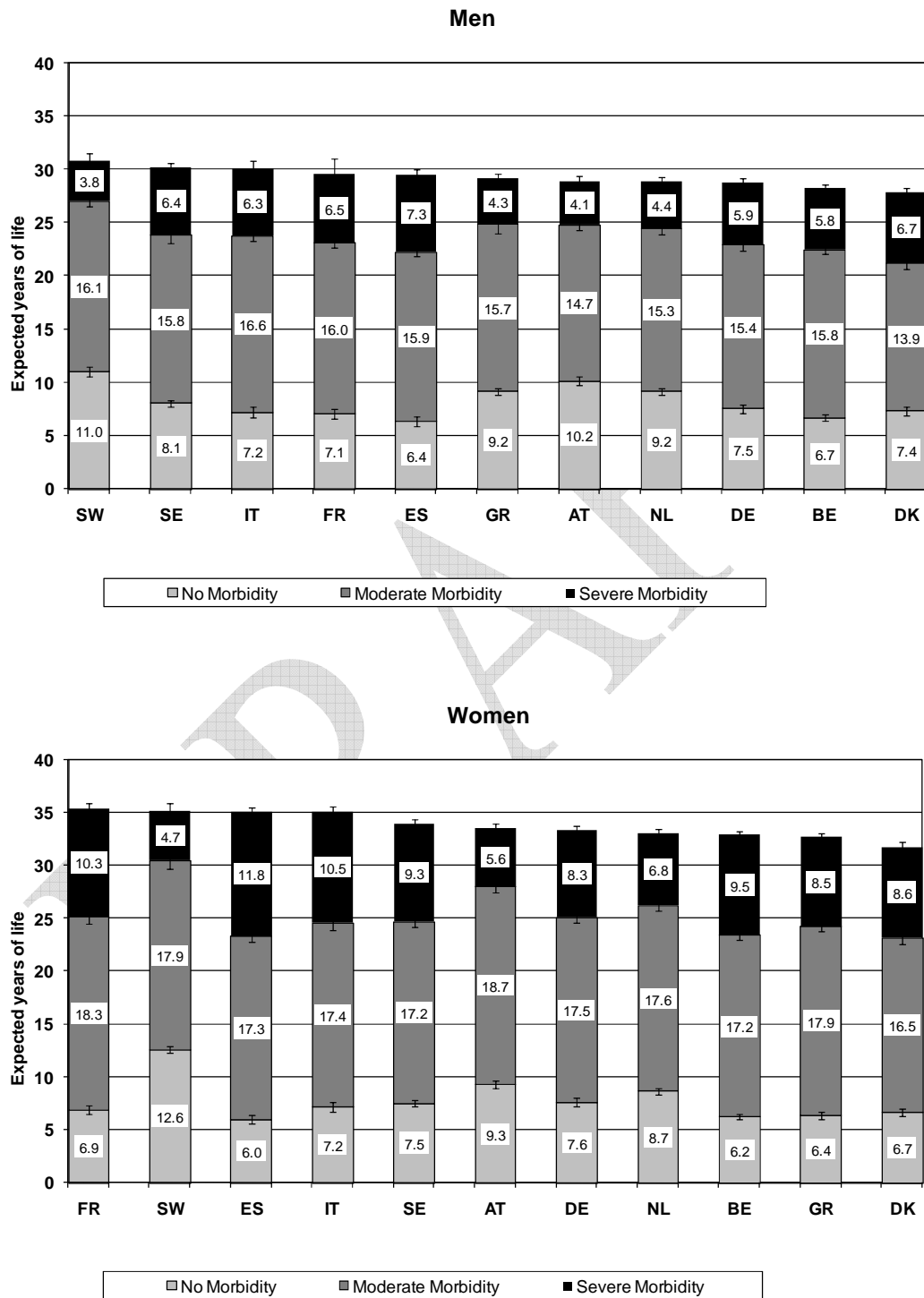
	Austria	Belgium	Denmark	France	Germany	Greece	Italy	Netherlands	Spain	Sweden	Switzerland
<b>Standardised prevalence of:</b>											
<b>Any morbidity</b>	65.4 (63.2-67.6)	75.5 (73.9-77.2)	73.1 (70.9-75.3)	74.0 (71.9-76.1)	70.3 (68.4-72.2)	70 (67.9-72)	74.1 (72-76.2)	67.3 (65.4-69.2)	76.8 (74.7-78.9)	70.9 (69.1-72.7)	59.3 (56.2-62.4)
<b>3+ comorbidities</b>	13.3 (11.8-14.9)	21.7 (20.2-23.1)	21.8 (19.8-23.7)	20.2 (18.3-22)	18.8 (17.3-20.3)	16.4 (14.9-17.9)	21.8 (20.1-23.6)	15.7 (14.3-17.2)	24.7 (22.7-26.6)	19.6 (18.2-21.1)	9.9 (8.1-11.7)
<b>Any physical functional limitation</b>	49.2 (46.9-51.5)	45.9 (44.1-47.8)	40.3 (38-42.7)	44.6 (42.2-46.9)	50.4 (48.4-52.4)	52.3 (50.1-54.5)	48.1 (45.8-50.3)	41.5 (39.6-43.5)	51.4 (49.1-53.7)	41.6 (39.7-43.4)	35.2 (32.3-38.1)
<b>Any activity limitation</b>	44.6 (42.4-46.9)	36.5 (34.7-38.2)	44.2 (41.8-46.6)	35.7 (33.5-38)	47.4 (45.4-49.4)	27.8 (26-29.7)	36.6 (34.5-38.7)	45.7 (43.6-47.7)	40.4 (38.1-42.7)	43.0 (41.1-45)	33.1 (30.1-36.1)
<b>Severe activity limitation</b>	12.7 (11.2-14.2)	13.1 (11.9-14.3)	13.2 (11.6-14.9)	14.2 (12.6-15.9)	15.3 (13.9-16.7)	6.5 (5.5-7.5)	10.2 (8.9-11.4)	21.4 (19.7-23)	5.1 (4.1-6.1)	14.7 (13.3-16)	9.4 (7.6-11.3)
<b>1+IADL limitation</b>	15.2 (13.7-16.7)	16.4 (15.1-17.6)	15.1 (13.4-16.7)	14.1 (12.7-15.6)	13.4 (12.2-14.6)	15.9 (14.5-17.3)	11.7 (10.5-13)	15.4 (14-16.8)	19.8 (18-21.5)	13.3 (12.1-14.5)	7.6 (6-9.2)
<b>1+ ADL limitation</b>	8.2 (7-9.4)	10.9 (9.9-11.9)	9.3 (8-10.7)	10.3 (9-11.7)	9.1 (8.1-10.1)	7.6 (6.6-8.7)	9.5 (8.3-10.6)	7.6 (6.7-8.6)	10.8 (9.5-12.1)	8.3 (7.3-9.3)	6.0 (4.6-7.5)
<b>Fair/poor self perceived health</b>	36.5 (34.3-38.7)	26.5 (24.9-28.1)	29.3 (27.1-31.5)	34.1 (31.8-36.3)	42.5 (40.5-44.4)	34.5 (32.5-36.5)	47.8 (45.5-50)	31.4 (29.6-33.3)	44.9 (42.6-47.3)	34.5 (32.7-36.4)	18.9 (16.4-21.3)
<b>Poor self perceived health</b>	8.7 (7.4-9.9)	5.9 (5.1-6.7)	8.4 (7.0-9.7)	8.7 (7.3-10)	12.9 (11.6-14.2)	6.9 (5.9-7.9)	9.8 (8.6-11.1)	6.4 (5.5-7.4)	14.4 (12.9-16)	9.4 (8.3-10.5)	3.5 (2.3-4.7)

\*standardized to European Standard population

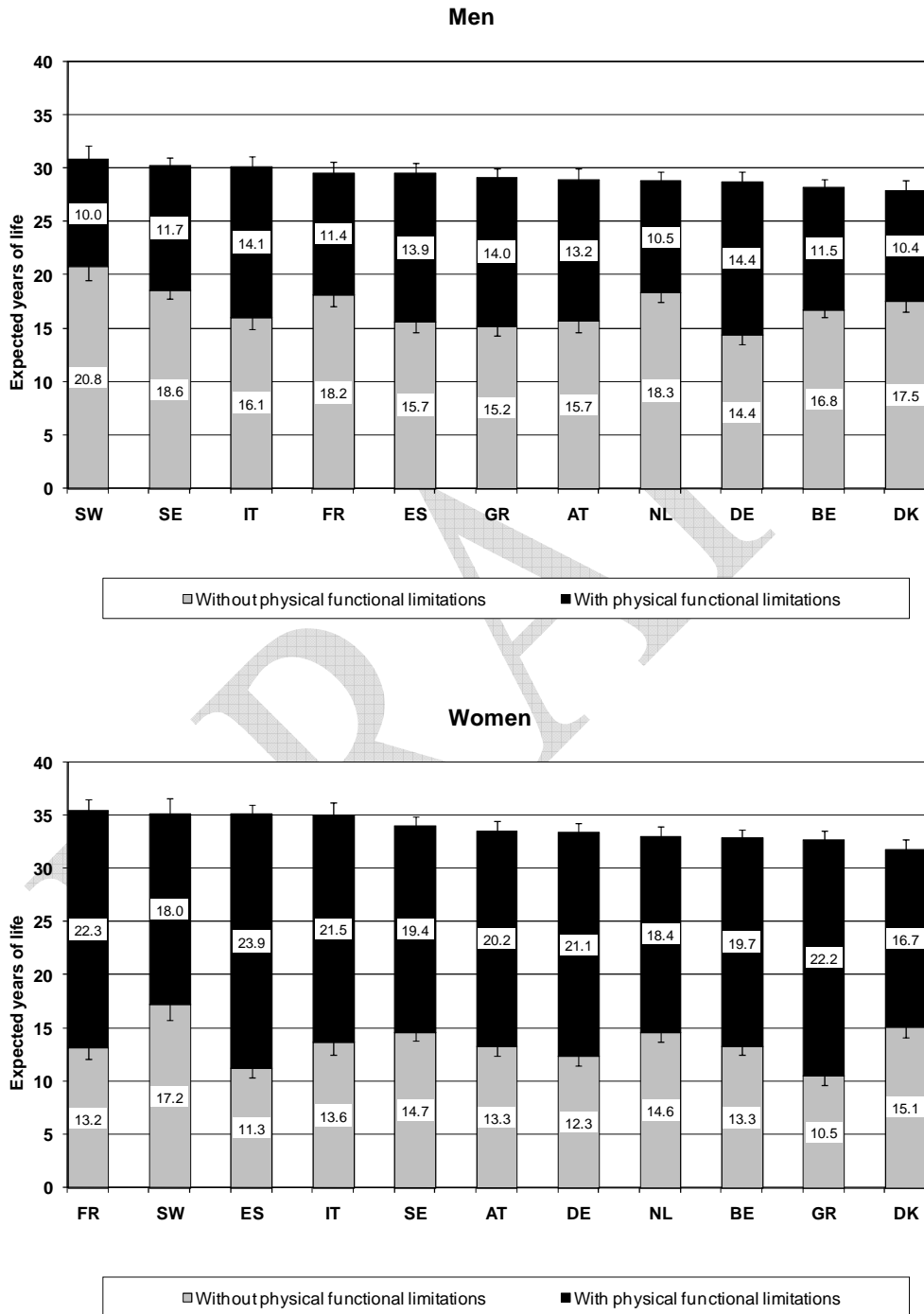
**Table 3: Mean proportion of life spent free of morbidity, impairment or disability at age 50 for men and women in each country grouping**

		<b>Italy, France, Spain</b>	<b>Austria, Belgium, Denmark, Germany, Netherlands, Sweden</b>	<b>Greece</b>	<b>Switzerland</b>	<b>ALL</b>
<b>LE at age 50 (yrs)</b>	<b>M</b>	29.8	28.8	29.2	30.9	29.3
	<b>F</b>	35.2	33.1	32.7	35.2	33.9
<b>Proportion of LE free of morbidity</b>	<b>M</b>	23.2	28.3	31.4	35.7	27.9
	<b>F</b>	19.0	23.1	19.4	35.8	22.8
<b>Proportion of LE free of PFL</b>	<b>M</b>	55.9	58.6	52.1	67.5	58.0
	<b>F</b>	36.0	41.9	32.1	48.9	40.1
<b>Proportion of LE free of activity restriction</b>	<b>M</b>	61.9	56.8	71.6	66.4	60.4
	<b>F</b>	51.3	48.3	60.6	60.5	51.3
<b>Proportion of LE free of IADL restriction</b>	<b>M</b>	84.1	86.0	86.0	93.8	86.2
	<b>F</b>	72.8	76.0	72.0	86.5	75.7
<b>Proportion of LE free of ADL restriction</b>	<b>M</b>	87.4	90.4	92.4	93.9	90.1
	<b>F</b>	82.8	86.1	86.9	90.2	85.7
<b>Proportion of LE in good self-rated health</b>	<b>M</b>	57.1	64.9	65.8	81.8	64.4
	<b>F</b>	47.8	59.0	53.1	77.0	57.0

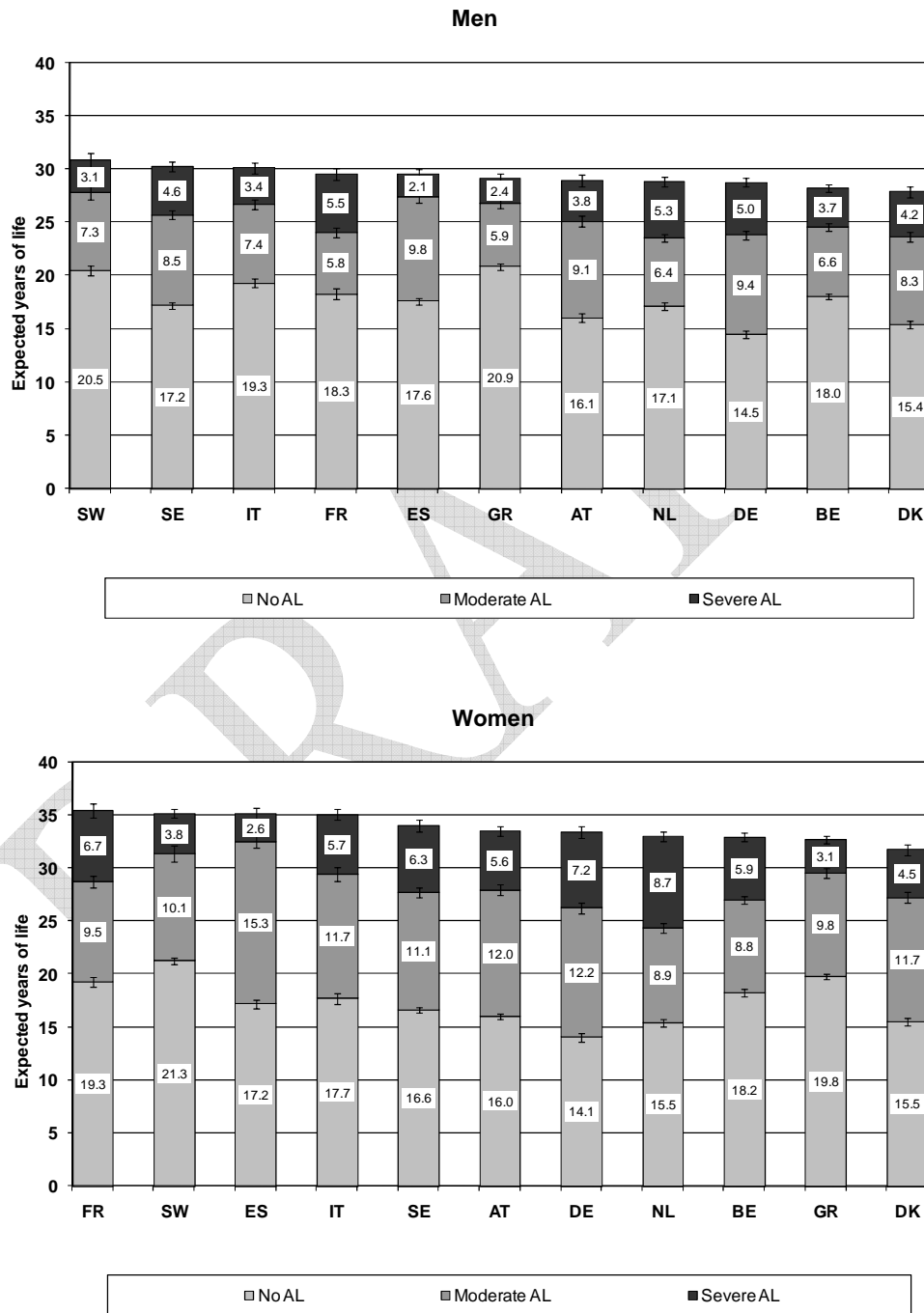
Figure 1: Life Expectancy at age 50 years with and without morbidity, by country



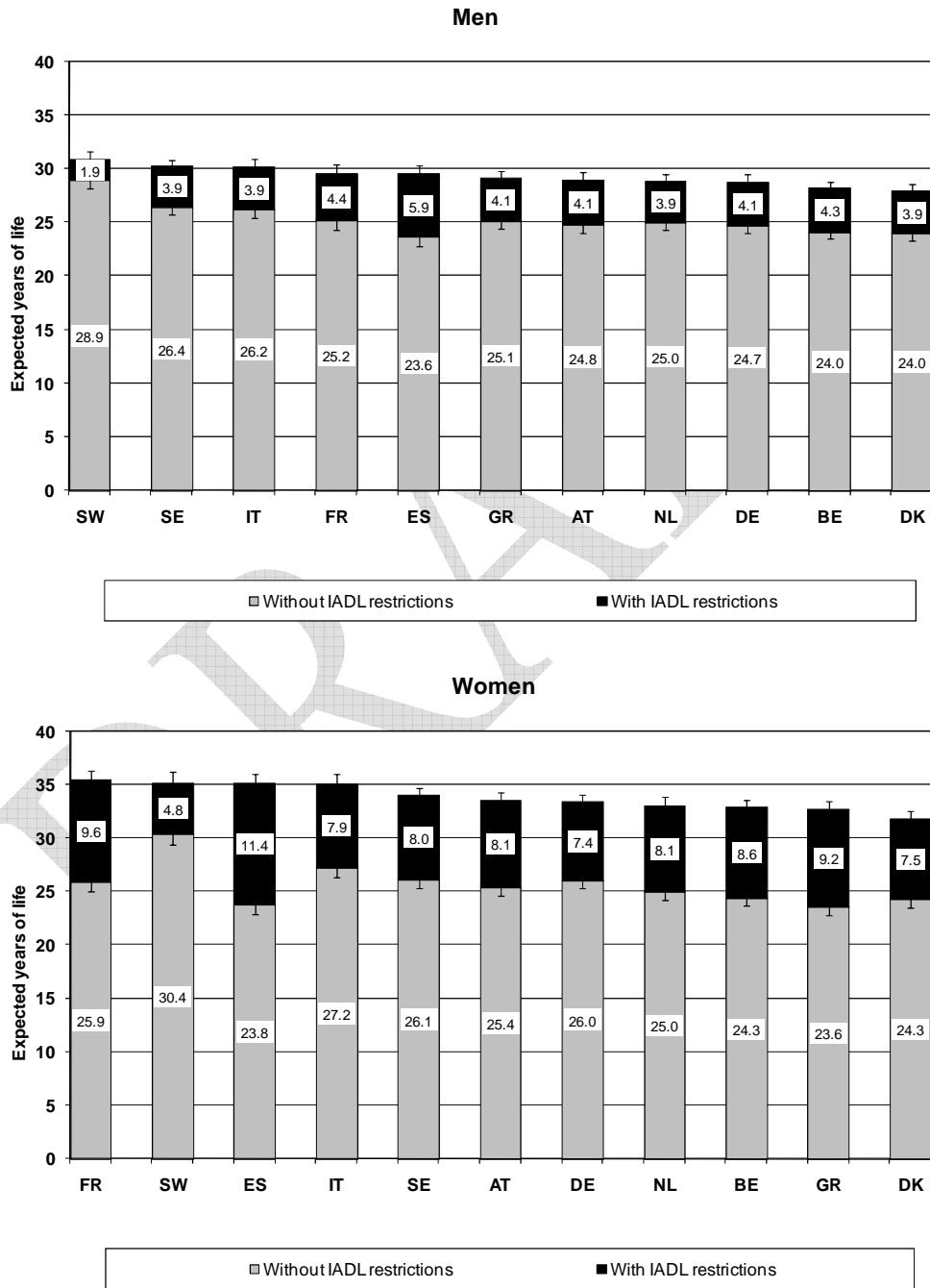
**Figure 2: Life Expectancy at age 50 years with and without physical functional limitations, by country**



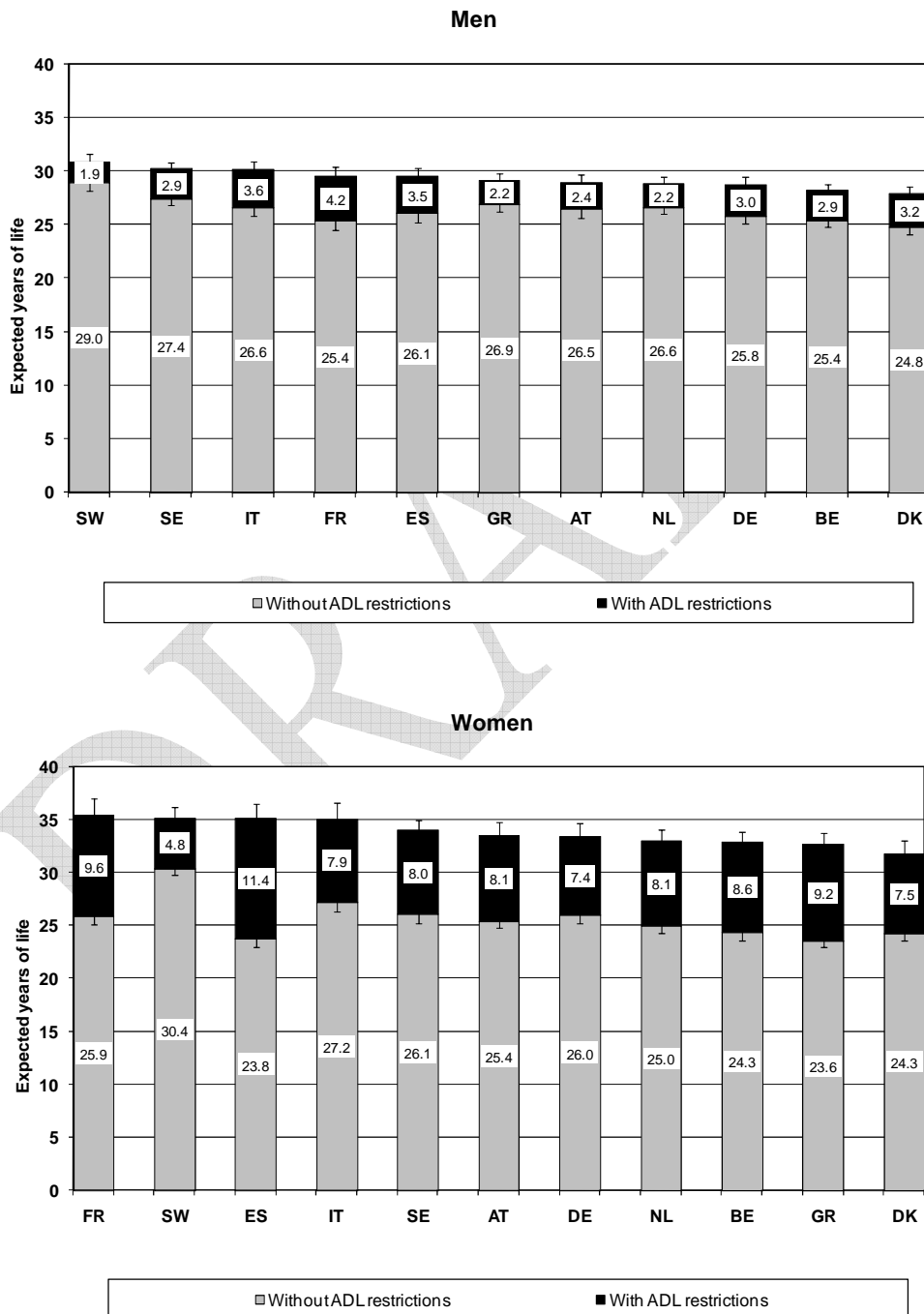
**Figure 3: Life Expectancy at age 50 years with and without activity restriction (HLY), by country**



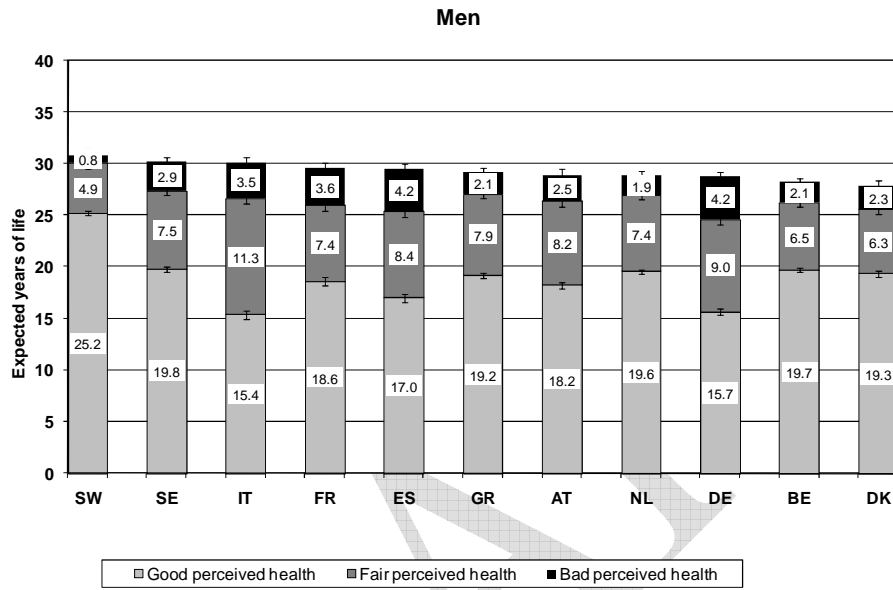
**Figure 4: Life Expectancy at age 50 years with and without IADL restriction, by country**



**Figure 5: Life Expectancy at age 50 years with and without ADL restriction, by country**



**Figure 6: Life Expectancy at age 50 years in good, fair and bad perceived health, by country**



1 Appendix 1

Indicator	Variable	Question	Categories	Process
Life expectancy without morbidity		Has a doctor ever told you that you had any of the following conditions?	<ol style="list-style-type: none"> <li>1. A heart attack including myocardial infarction or coronary thrombosis or any other heart problem including congestive heart failure</li> <li>2. High blood pressure or hypertension</li> <li>3. High blood cholesterol</li> <li>4. A stroke or cerebral vascular disease</li> <li>5. Diabetes or high blood sugar</li> <li>6. Chronic lung disease such as chronic bronchitis or emphysema</li> <li>7. Asthma</li> <li>8. Arthritis, including osteoarthritis, or rheumatism</li> <li>9. Osteoporosis</li> <li>10. Cancer or malignant tumour, including leukaemia or lymphoma, but excluding minor skin cancers</li> <li>11. Stomach or duodenal ulcer, peptic ulcer</li> <li>12. Parkinson disease</li> <li>13. Cataracts</li> <li>14. Hip fracture or femoral fracture</li> <li>96. None</li> <li>97. Other conditions, not yet mentioned</li> </ol>	One or two conditions was classified as moderate morbidity, 3+ conditions was classified as severe morbidity
Life expectancy without physical functional limitations (PFL)	Physical Functional Limitations	We need to understand difficulties people may have with various activities because of a health or physical problem. Please tell me whether you have any difficulty doing each of the everyday activities. Exclude any difficulties that you expect to last less than three months.	<ol style="list-style-type: none"> <li>1. Walking 100 metres</li> <li>2. Sitting for about two hours</li> <li>3. Getting up from a chair after sitting for long periods</li> <li>4. Climbing several flights of stairs without resting</li> <li>5. Climbing one flight of stairs without resting</li> <li>6. Stooping, kneeling, or crouching</li> <li>7. Reaching or extending your arms above shoulder level</li> <li>8. Pulling or pushing large objects like a living room chair</li> <li>9. Lifting or carrying weights over 10 pounds/5 kilos, like a heavy bag of groceries</li> <li>10. Picking up a small coin from a table</li> <li>96. None of these</li> </ol>	Problems with at least one of the activities were classified as having limitations.
Life expectancy without activity limitation (HLY)	Activity limitation because of health problems	For the past six months at least, to what extent have you been limited because of a health problem in activities people usually do?	<ol style="list-style-type: none"> <li>1. Severely limited</li> <li>2. Limited, but not severely</li> <li>3. Not limited</li> </ol>	This variable was aggregated resulting in two categories: (0) not limited & (1) limited.

<b>Indicator</b>	<b>Variable</b>	<b>Question</b>	<b>Categories</b>	<b>Process</b>
Life Expectancy without self care activity restrictions (ADL)	Activities of Daily Living	Please tell me if you have any difficulty with these because of a physical, mental, emotional or memory problem.	<ol style="list-style-type: none"> <li>1. Dressing, including putting on shoes and socks</li> <li>2. Walking across a room</li> <li>3. Bathing or showering</li> <li>4. Eating, such as cutting up your food</li> <li>5. Getting in or out of bed</li> <li>6. Using the toilet, including getting up or down</li> </ol>	Problems with at least one of the activities were classified as having restrictions.
Life Expectancy without instrumental activity restrictions (IADL)	Instrumental activities of daily living	Please tell me if you have any difficulty with these because of a physical, mental, emotional or memory problem.	<ol style="list-style-type: none"> <li>7. Using a map to get around in a strange place</li> <li>8. Preparing a hot meal</li> <li>9. Shopping for groceries</li> <li>10. Making telephone calls</li> <li>11. Taking medications</li> <li>12. Doing work around the house or garden</li> <li>13. Managing money, e.g. paying bills &amp; keeping track of expenses</li> </ol>	Problems with at least one of the activities were classified as having restrictions.
Life expectancy in good perceived health (SPH)	Health Self-perception	Would you say your health is ...	<ol style="list-style-type: none"> <li>1. Very good</li> <li>2. Good</li> <li>3. Fair</li> <li>4. Bad</li> <li>5. Very bad</li> </ol>	Answers were reclassified into three health states: (i) Good perceived health: « very good » or « good » (ii) Fair perceived health: « fair »; (iii) Bad perceived health: « bad » or « very bad ».