

Mortality compression and equilibrium trend in health: the Spanish case

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Spanish population exhibits one of the highest life expectancies in the world, although its mortality transition took place later than in many other European countries. Women, in particular, have had rapid gains with life expectancy of almost 83 years. Men lag women by 7 years, with a life expectancy of almost 76 years.

During the last 30 years of the XXth century (1970-2001), the most important socio-demographic processes are the following: 1) Ageing at the vertex of the population pyramid due to a high life expectancy and a high longevity. 2) Feminization of the elderly followed by a stabilization of the difference by gender in the life expectancy. 3) Spain is currently within the last period of the Health-Epidemiological Transition, and it is experiencing a slow but continuous decline of mortality until the present time (Gómez-Redondo and Boe, 2005).

In this work we would like to present new data to contribute to the knowledge of the health evolution among European countries, following the theoretical objective presented by Robine and Michel (2004): How to integrate the Disability Transition in the fourth phase of the Age of Delayed Degenerative Diseases (Olshansky and Ault, 1986). To this end, we will first describe the present situation of Spanish mortality and longevity, followed by a study of the trends observed in the health of the Spanish population, always limited by the nature and heterogeneity of the available data.

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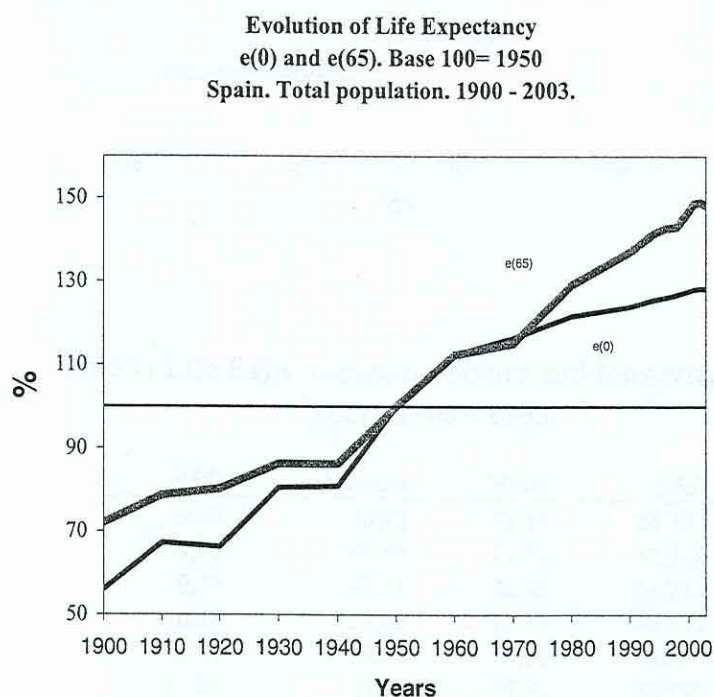
Methodological References

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1. INCREASE OF LIFE EXPECTANCY, COMPRESSION OF MORTALITY AND RECTANGULARIZATION OF THE SURVIVAL CURVE.

During the XXth Century there is an increase of the mean age of the population, but from 1970 onwards the decrease of infant mortality starts losing its pivotal importance. Contributions of older ages to the increase of life expectancy are since then higher than those derived from the rest of the pyramid, and they are still rising during the last three decades, especially within the women population. Nevertheless, during the 90's men improve their relative position respect women, with indications that there will be in future a convergent trend in death by gender.

Figure 1:



If we set 100 the year 1950, the evolution of the series of life expectancy -at birth- and at 65 years-, shows that in 1970 both indicators reach a similar relative increase, being the life expectancy of older population the one with a higher and a more growing increment since then (Figure 1).

1.1 Mortality compression.

The compression of mortality (Fries, 1980) at mature and older ages is evident in the theoretical death series at the beginning of the XXth and XXIst Centuries (Figure 2), as well as in the indicators of the following Table 1 (Herce, Genova and Pereira, 2003).

In spite of the fact that life expectancy at 65 years lowers the wide dispersion of the average represented by the LE, we have to look for more specific measurements for longevity. Modal age at death (Kannisto, 2001) is one of them, as it avoids the dispersion of the phenomenon. Figure 2 shows that in 2003, age of 84 is the most frequent death age in men, while it is 88 for women in Spain. In 1970, the values were only 77 for men and 84 for women.

Figure 2 :

Deaths (nDx), mode, median and life expectancy at birth in Spain.
Total population. Years 1900 and 2003.

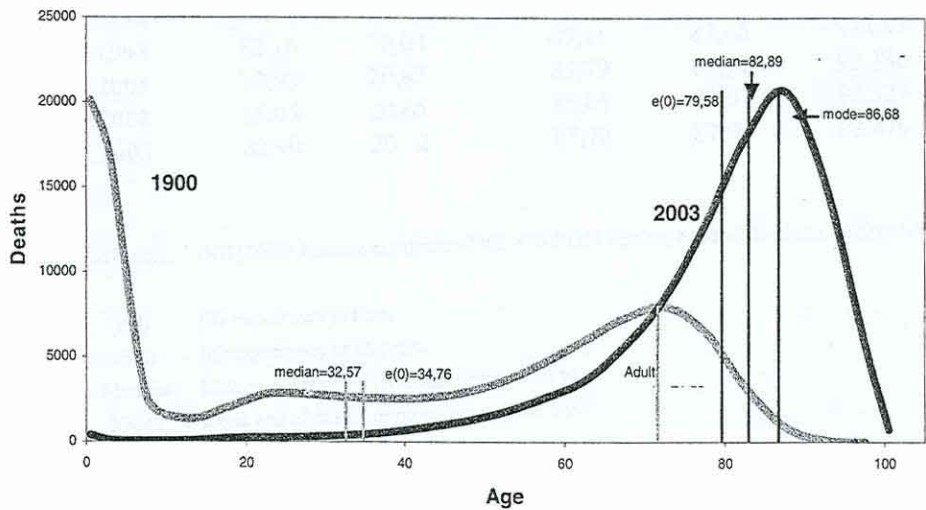


Table 1: Life Expectancy, survivors and longevity. Spain.
Years 1900 - 2003.

MEN	e(0)	e(65)	Median	Mode	l(65)	l(95)	P90
1900	33,85	9,00	30,73	71,14	24.307	5	74,91
1910	40,92	9,81	48,96	71,59	32.246	21	78,02
1920	40,26	9,72	47,31	72,35	31.718	15	77,75
1930	48,38	10,38	59,02	73,13	40.873	40	79,99
1940	47,12	9,87	55,54	70,15	34.889	31	78,63
1950	59,81	11,83	67,90	75,79	56.593	183	84,03
1960	67,40	13,14	72,89	77,46	69.464	777	86,92
1970	69,57	13,25	73,63	77,23	72.377	1.101	87,30
1980	72,52	14,77	76,10	80,16	77.009	2.551	89,32
1990	73,40	15,53	77,12	81,28	77.966	2.717	90,19
1994	74,35	16,01	77,97	82,47	79.325	3.041	90,88
1996	74,74	16,10	78,28	82,60	80.130	2.982	90,99
1998	75,25	16,11	78,52	82,63	81.162	2.914	90,95
2001	76,12	16,82	79,39	84,15	82.001	3.833	92,00
2002	76,24	16,84	79,54	83,96	82.414	3.867	92,02
2003	76,26	16,80	79,64	83,82	82.543	3.470	91,86

WOMEN

	e(0)	e(65)	Median	Mode	l(65)	l(95)	P90
1900	35,70	9,23	34,50	71,89	28.084	7	76,31
1910	42,56	10,10	51,66	73,29	36.126	22	78,93
1920	42,05	10,59	50,21	74,26	36.513	34	79,56
1930	51,60	11,46	64,17	76,02	48.899	79	82,50
1940	53,24	11,94	65,30	76,71	50.564	131	83,38
1950	64,32	13,48	72,97	80,11	67.472	402	86,70
1960	72,16	15,31	77,35	80,87	79.253	2.305	89,54
1970	75,06	15,89	78,80	81,76	83.523	2.606	90,26
1980	78,61	17,93	81,75	84,05	88.067	5.853	93,18
1990	80,49	19,17	83,47	85,99	90.063	7.190	94,07
1994	81,51	19,81	84,55	87,04	91.120	7.588	94,31
1996	81,88	20,02	84,92	87,34	91.546	7.739	94,39
1998	82,16	20,09	85,11	87,45	92.039	7.593	94,36
2001	82,98	20,82	85,79	87,99	92.386	10.570	95,31
2002	83,05	20,85	85,85	88,07	92.527	10.189	95,11
2003	82,90	20,72	85,78	87,96	92.476	9.285	94,82

Data source: INE (2005) Anuario estadístico 2005. CD-ROM edition, Madrid, Instituto Nacional de Estadística.

e(0)	life expectancy at birth.
e(65)	life expectancy at 65 years.
Median	Median death or survival age, or percentil 50.
Mode	mode age of death , or most frequent life span.
l(65)	number of survivals at exact age 65.
l(95)	number of survivals at exact age 95.
P90	Death percentil 90, or age in which survives 10% of starting cohort.

We have also used another indicator, the median death age¹, which at the end of the period under study reaches a value of 79.6 for men and 85.8 for women, that is, the age in which the starting cohort is reduced to a half. It is somewhat surprising the distance between those ages in which there is still 50% of the initial number for the different periods of the historical series shown in Table1. For example, in 1970 the values were 73.6 for men and 78.8 for women, representing a difference of around 6 years in a period of only 20 years.

It is noteworthy that in 1900 there is a clear bimodal distribution (one mode for children and another one for adults), something that is only reduced when infant mortality reaches reduced values, something happening around 1970, as discussed above. At the beginning of the period the LE at birth and the median are further apart from the mode, while almost one century after the three indicators are very close, and centered over older ages. This proximity demonstrates the longevity of the population, as well as the compression of the Spanish mortality (Robine 2001). This compression is not absolute until present times, and the movement of deaths towards progressively older ages has

¹ Median death age is less sensitive to dispersion than life expectancy, although it is affected more than modal age.

not a fixed limit. The maximal age of death is moving ahead, as shown in the modal age series (Willmoth, 2000).

Finally, a further argument consistent with the very high longevity of Spaniards: Women in 1900 surviving 65 years were only 28%, and only 7 over 100,000 reached 95 years. Today, 92% of women reach retirement, but almost 10.000 reach 95 years of age. Men have also advanced its mortality at older ages, but to a smaller extent. Retirement age was reached by 24% in 1900 to 82% today, while 5 out of every 100,000 reached 90 years at the beginning of the century and between 3500 and 4000 did so in any year of the period 2001-2003.

Also, today women have to wait until 95 years to leave one tenth of the initial cohort (P90), and almost 92 years in men. These values represent between twenty and fifteen years, respectively, more than at the beginning of the century (i.e., 90 out of every 100 women of the initial cohort live up to 95 years, and 92 for men).

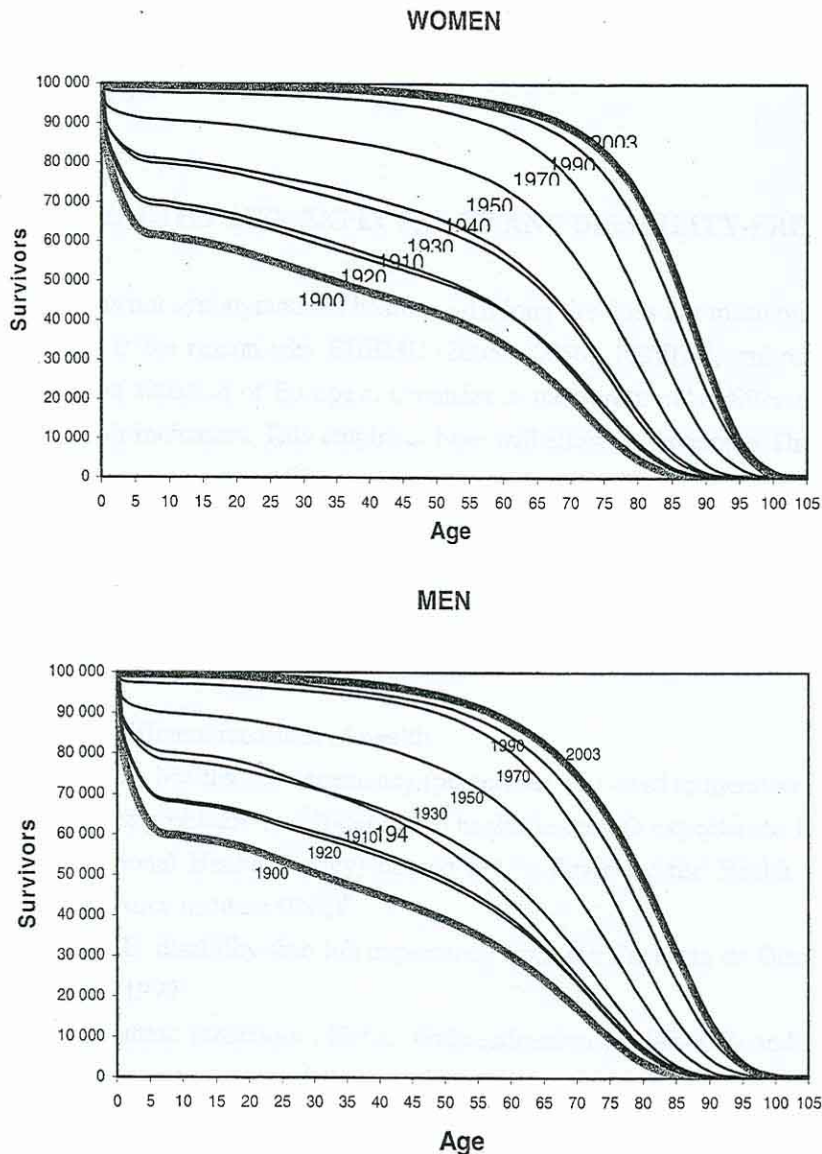
1.2 Rectangularization of the survival curve.

The increment in life span, a consequence of the mortality transition on the population, can be observed both by the continuous advance in the maximum ages of life² (Vallin and Meslé, 2001), as well as by the growing proportion of persons surviving at older ages in societies exhibiting advanced demographic characteristics (Vaupel and Jeune, 1995).

The structure of mortality has changed during the XXth century, as it does the Spanish profile of the survival curve. A rectangularization of the curve of survivors takes place, especially clear in women. At the beginning of the century there was a high concentration of deaths at the youngest ages, while by mid-century the concentration of deaths at older ages started. Nevertheless, it is not until the 70's that the present pattern becomes established: Mortality compressed into the old ages (Robine, 2001) and a rectangularization of the survivors curve appeared (Levi, 1996). The figure 3 shows that after one century not only the LEs of men and women are 7 years apart, but also that their mortality structure is very distant. Thus, from a mortality criterion, women population has evolved faster in the last stages of the epidemiological transition. The higher effectives of women at the older ages had generated a feminization of the old population.

² Deaths of 100 and older have change from 350 a 1200 among women, and from 100 to 365 in men, in a period of 25 years (1975-2000).

Figure 3: Spain. Survivors by age. 1900 – 2003.



Nevertheless, for the time being it is not possible to extrapolate this trend to the onset of the XXIth century, as there is a clear trend to stability during the period 2001-2003. There is maintenance of the life expectancy at birth, and also at older ages, with a slight decrease in the last year 2003. Is this reflecting a present mismatch between the demographic evolution and the available context? It is maybe too early to know if this represents a blockade in the trend.

Taking into account the first three years of the XXIth century, as compared with the previous decade, there is a certain stabilization. It looks that there is a plateau due to the scientific and social context that we live, as well as the longevity degree of our population. Historical experiences have shown that there were several stability periods along the latest stage of the mortality transition.

Consequently, from the preliminary, and probably related to particular circumstances³ trends of the blockade in the process it is hard to conclude any firm conclusion until completion of the data. This relates to access the causes of death in 2003 that would allow to know the origins and the degree of this stability period.

2. HEALTHY LIFE EXPECTANCY AND DISABILITY-FREE LIFE EXPECTANCY.

Longevity is not synonymous of health, and a long life does not mean quality of life during the lived years. This is the reason why EHEMU (2005; 2005b), REVES⁴, and other projects⁵ have analyzed for years the situation of European countries to measure trends, differentials and crisis through the use of health indicators. This empirical base will allow to develop a Theory on Population Ageing. Up to now, these comparative studies are based on the European Community Household (ECHP), and other complementary sources.

Our study shows indicators for Healthy and Disability-free Life at different periods from three official sources at the national level for the Spanish population. We have selected these sources complementary to those widely known through the studies of EHEMU and REVES (Robine et al, 1999; 2003).

We use two different measures of health:

- 1) HLEP, healthy life expectancy (perceived). It is used to measure the effect of the prevalence of the problems of self-perceived health in the life expectancy. It is obtained from the ENS (National Health Survey) carried out in Spain by the Health Ministry and the National Statistics Institute (INE)⁶.
- 2) DFLE, disability-free life expectancy from the Encuesta de Discapacidad y Minusvalía, by INE 1999.

In any case, these indicators offer an underestimation of disability and bad health, as they do not collect representative data of the population living in institutions. It is more than likely that the results on the partial population analyzed would not be similar to those corresponding to the more dependent population that is characteristic of institutional residences.

- 3) Finally, we present some complementary data to the two above indicators for the final period (2000). A comparison is made between the main mortality causes in Spanish mortality with the profile of those more relevant leading to disability from the Burden of disease.

2.1 Life expectancy and healthy life expectancy perceived (1987, 1993, 1997, and 2003).

Although the National Health Surveys (ENS) carried out by the Health Ministry are not fully comparable, they nevertheless allow to perform a comparative analysis of the self-perceived health, that is reflected (with particular peculiarities) for years 1987, 1993, 1997 and 2003.

³ During the summer in 2003 there were a high number of deaths in Europe, especially among elders. Similar factors can contribute to compensate in a period the small health increments of a population with very low mortality.

⁴ European Health Expectancy Monitoring Unit, and Réseau sur l'Espérance de Vie en Santé.

⁵ AGIR (Ageing, Health and Retirement in Europe), for Spain.

⁶ The one corresponding to 2003 was the first one carried out by this organism.

Table 2: Healthy Life Expectancy Perceived at different ages. 1987-2003.

		Life Expectancy (LE)				
<i>Men</i>		1987	1993	1995	1997	2003
	0	73,7	74,2	74,5	75,3	76,3
	15	59,8	60	60,2	60,9	61,8
	45	31,8	32,3	32,5	32,8	33,5
	65	15,6	16	16,2	16,4	16,8
		Healthy Life Expectancy Perceived (HLEP)				
<i>Men</i>		1987	1993	1995	1997	2003
	0	54,4	54,9	54	55,3	56,3
	15	41,7	42,2	41	42,3	43,4
	45	17,7	18,4	17,6	18,4	18,9
	65	7	7,2	6,8	7,6	7,5
		Life Expectancy (LE)				
<i>Women</i>		1987	1993	1995	1997	2003
	0	80,4	81,4	81,8	82,3	82,9
	15	66,2	67,1	67,5	67,9	68,4
	45	37,2	38	38,4	38,7	39,1
	65	19,2	19,8	20,1	20,4	20,7
		Healthy Life Expectancy Perceived (HLEP)				
<i>Women</i>		1987	1993	1995	1997	2003
	0	52,6	54	53,2	54,9	54
	15	39,6	40,9	39,9	41,7	40,9
	45	16,2	17,6	17	18	17,3
	65	6,8	7,5	7,2	8	6,7
		% HLEP over LE				
<i>Men</i>		1987	1993	1995	1997	2003
	0	73,8	74,1	72,5	73,5	73,9
	15	69,8	70,4	68,1	69,4	70,2
	45	55,6	56,9	54,2	56,1	56,6
	65	44,6	45,1	41,9	46,3	44,4
		% HLEP over LE				
<i>Women</i>		1987	1993	1995	1997	2003
	0	65,4	66,4	65	66,7	65
	15	59,7	60,9	59,2	61,5	58,9
	45	43,7	46,2	44,2	46,5	44,2
	65	35,6	37,7	35,5	39,2	32,3

Sources: INE. Evolucion de la población de España entre los censos de 1981 y 1991. Madrid, 1996.

INE. Proyecciones de la población de España calculadas a partir del censo de población de 1991. Id. 2001.

INE. Movimiento Natural de la población. Years 1987, 1993, 1995, 1997 and 2003.

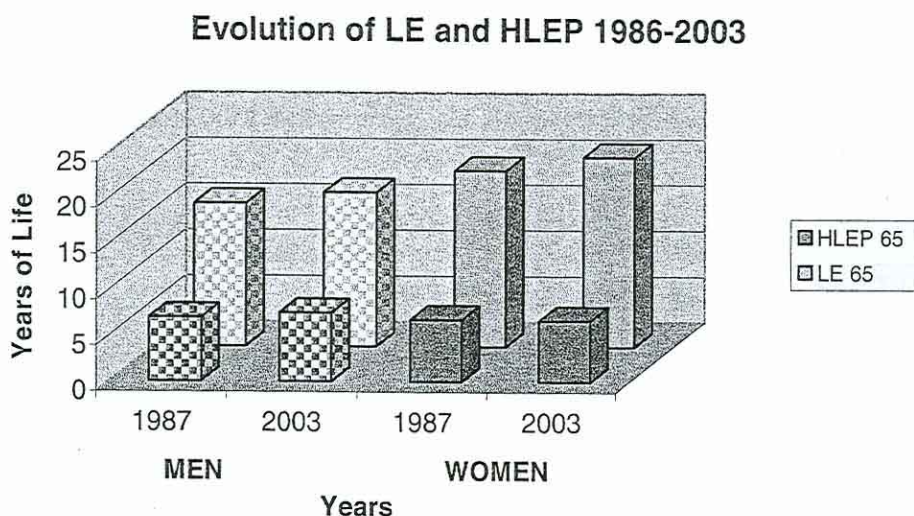
Ministerio de sanidad y Consumo. Encuesta Nacional de Salud. Years 1987, 1995, 1995, 1997 and 2003.

In the survey, the answers show the self-perception of the health condition limited to a certain period (last year). The range offered was: Very good, Good, Average, Bad and Very Bad. We have considered Good health condition as comprising the answers Very Good and Good.

The more recent data (table 2) on good health for Spain (2003) reveal that men at 65 years old expect to live 16.80 years, while women expect 20.72. But if the question is the health condition during these years, the numbers are reduced to around 7.5 for men and less of 7 for women enjoying good health conditions. In relative terms, this represents a 44% of total Life Expectancy, and even more in women that only live in a good shape 32% out of those years. Quite paradoxically, the observed situation in differential longevity by gender is inverted when referring to inequality in health⁷. It is important to note that this differential between men and women in respect to perceived healthy life is not only observed at older ages, but is also present with a similar level along the whole population pyramid.

The comparison of the evolution of healthy life expectancy perceived between the two Health Surveys from the beginning and the end of the period under study, show that between 1987 and 2003 the HLEP has increased both for men and women (Figure 4).

Figure 4:



The Table 2 shows that the values for HLEP for the different surveys show a number of years of healthy life very similar for men and women, although it is slightly lower in the latter. Nevertheless, these years represent a lower value when related to the corresponding LE, due to the larger longevity of women, as mentioned above for those older than 65 years in 2003. For this reason the comparison of the data for the HLEP respect to LE showed in the third part of the Table 2 reveal more clearly these differences.

It is important to note the stabilization of the trend towards a more healthy life for the whole period covered by our data. There are also oscillations from one survey to the other, but they do not support either any continuous increase in health or a morbidity expansion. During this period there is a slight trend towards the increase of years of healthy life in the middle 90's, followed by oscillations since then. In any case, 2003 represents a step back in the health of older men, as well as for all women, especially for those older than 65 years.

⁷ The healthy life expectancy of people older than 75 years is 4.0 years for men and 3.6 for women.

Taking into account the observed ill defined trend, we have carried out a study of the rhythm of the increment of the LE in populations over 65 years as compared with that followed by the increment of the HLEP (Table 3). The period under study has been divided in two: 1987 to 1995, and 1995 to 2003. The results are shown in the following Figure 5.

Figure 5:

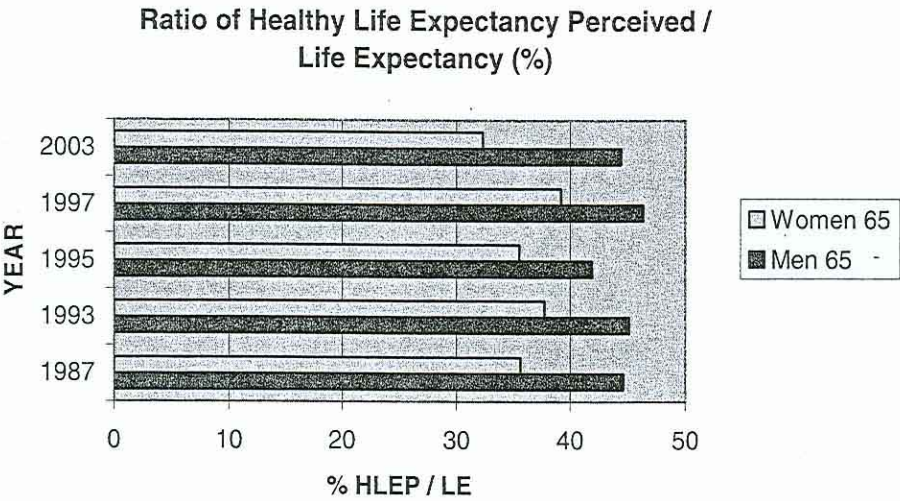


Table 3: Evolution of Life Expectancy and Healthy Life Expectancy Perceived. 1987-1995 and 1995-2003

	Life Expectancy			
	Men		Women	
	1987/1995	1995/2003	1987-1995	1995/2003
0	1,08	2,42	1,74	1,35
15	0,67	2,66	1,96	1,33
45	2,2	3,08	3,23	1,82
65	3,85	3,7	4,69	2,99

	Healthy Life Expectancy Perceived			
	Men		Women	
	1987/1995	1995/2003	1987/1995	1995/2003
0	-0,74	4,09	1,14	1,5
15	-1,68	5,85	0,76	2,51
45	-0,57	7,39	4,94	1,77
65	-2,86	10,29	5,88	-6,94

Sources: INE. Evolucion de la población de España entre los censos de 1981 y 1991. Madrid, 1996.
 INE. Proyecciones de la población de España calculadas a partir del censo de población de 1991. Id. 2001.
 INE. Movimiento Natural de la población. Years 1987, 1993, 1995, 1997 and 2003.
 Ministerio de sanidad y Consumo. Encuesta Nacional de Salud. Years 1987, 1995, 1995, 1997 and 2003.

While there is a moderate increment of the LE in men and women for each sub period, the HLEP shows a small decrement in the first part of the period for men, followed by a notable recovery in the

second part. For women, the results are different: their decrease in health in 2003 could be recovered in the next survey, as it happened previously with men (Figure 6). On the other hand, in the group 45-64 (Figure 7) we observe gains in both gender, but also adult men acquire a better health condition from 1995⁸, while women improve their health perception in the previous period, as it happened with the older than 65 years.

Figure 6:

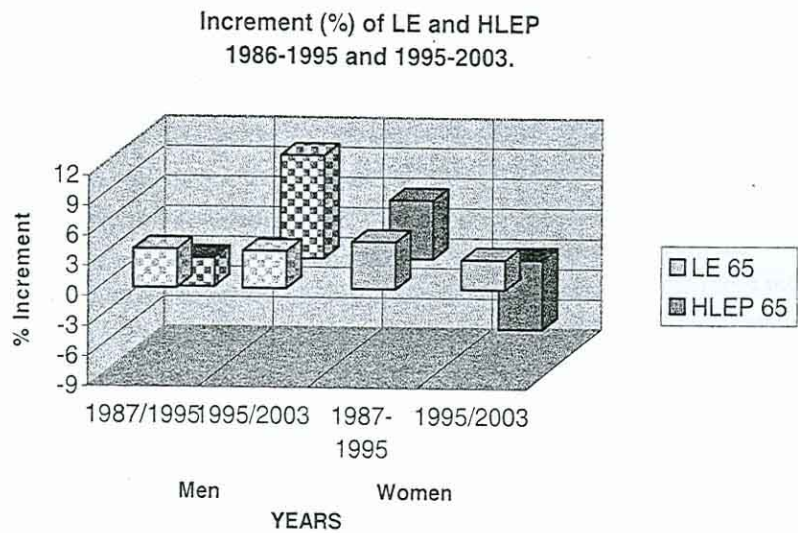
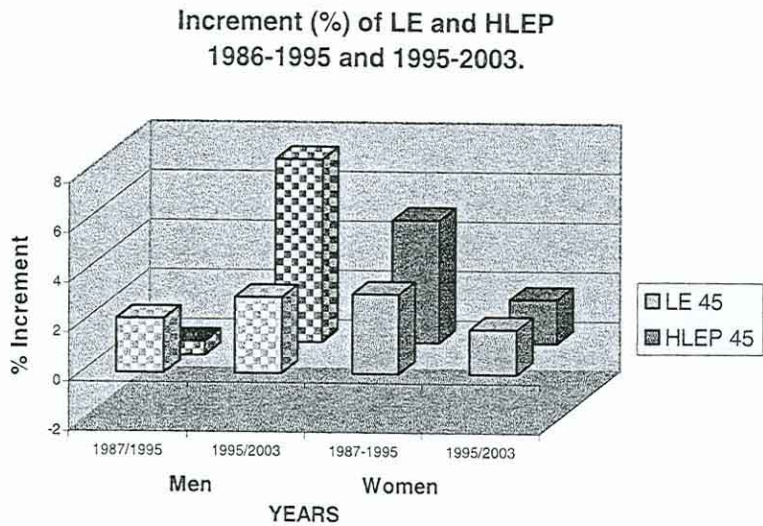


Figure 7:



It is noteworthy that HLEP in 1997 pointed to a small increment during the last years, even higher than the LE, both for men and women. Nevertheless, more recent data break again this trend by stepping back the quality of life levels, especially for women. A similar situation happened in 1995 in respect to the advances in 1993, although at a lesser extent. Does this represent a new step once

⁸ Recovery after the end of the health and mortality crisis that affected men in several European countries, including Spain (Gómez-Redondo, 1995), a crisis that was reflected in the lost of LE in several age groups.

we have reached the ultimate medical, economic and social levels during the previous decades?, and would this produce a stabilization to reach a new period of improvement within the new context?. We have to consider that within the group of 65 + women show an older age structure, and this would prevent to conclude an expansion of morbidity. For the time being, our observations indicate that the HLEP in Spain is maintained after a compression of morbidity (Fries, 1980) within a period of dynamic equilibrium (Manton, 1982).

2.2 Disability-free life expectancy.

Disability is a growing fact along the human life cycle, and there is a cumulative probability with age to suffer different types of disability. This also leads to co-disabilities, characterizing the increasing fragility and vulnerability of the elder (Robine et al, 2004).

Men and women are both affected by deficiencies in their functional capabilities, both in their personal care, daily basic activities, home and family maintenance, and instrumental activities during daily life. Although limited by the sources and methodology, we will analyze the Spanish population using the single survey as delivered by official Spanish authorities. This survey was organized by the Instituto Nacional de Estadística (INE) in 1999, and it contains the more recent data available. There was another survey in 1986 also organized by the INE but, unfortunately, from a methodological point of view both surveys can not be compared⁹ (Gutiérrez et al, 2000; Génova-Maleras and Pereira, 2003; Puga and Abellán, 2004). The diversity of the data is too important. It did not generally ask for the same activities, and when this was done, the question was not exact. The absence of enough surveys and the heterogeneity in the questions and categories avoid any possible analysis of the evolution of the disability. For the time being it is thus not possible either empirically support or discard the existence of a disability and morbidity pandemic in Spain (Freedman, 2002; Gruenberg, 1980) as a consequence of ageing and the consequent high survival of the Spanish population, as we have only access to a single description for a period at the end of the XXth century.

The trends for Impairment, Disabilities and Handicaps are common for both genders. Nevertheless, the DFLE of women over 65 years is higher by 4 years than that for men at the survey moment. In fact, the number of years in DFLE is, in absolute terms, very similar for men and women, but if we consider the proportion that these years disability-free represents in the expected total years to live by these Spaniards when reaching the older ages, these years disability-free represent for women a smaller rate than in the case of men. This means more years to live but a lower health level for women than for men.

Let us take an example from the Table 4 and the Figure 8. In 1999, the LE at age 65 is more than 20 years in women and 16 for men. In fact, if we consider the number of years that older Spaniards live without any disability we get around 11 years for men, representing a 70% of their life expectancy, while in the case of women –that have 12 years, one more than men it represents only 61% of the life to live. If we consider the case of severe disability, the difference in health is even higher in favour of men. Whatever the type of disability preventing any activity, this ratio DFLE / LE according to gender is maintained. In the cases of severe disability the corresponding DFLE(s) is slightly higher, around 2 years more than disability-free, both for men and women.

⁹ Although there are some categories that could be comparable between both surveys, this is not the case for those more relevant, leading to discard them by other researchers (Puga and Abellán, 2004). Only the 1999 survey adheres to the International Classification for Functioning, Disability and Health (WHO, 1980).

Table 4: Disability-free Life Expectancy.
Disability Survey 1999. Spain, (Ages 0 and 65, by sex).

	DFLE				DFLE / LE (%)			
	Age 0		Age 65		Age 0		Age 65	
	Women	Men	Women	Men	Women	Men	Women	Men
EV	82,31	75,29	20,25	16,17				
EVLEC	37,89	40,85	2,77	3,31	46,0%	54,3%	13,7%	20,5%
EVBS	58,17	59,52	7,52	7,78	70,7%	79,1%	37,1%	48,1%
EVLD	72,12	68,52	12,39	11,39	87,6%	91,0%	61,2%	70,4%
EVLD1	75,44	71,07	14,66	13,09	91,7%	94,4%	72,4%	80,9%
EVLD2	75,06	71,17	14,29	13,03	91,2%	94,5%	70,6%	80,6%
EVLD3	77,07	72,68	15,56	13,94	93,6%	96,5%	76,8%	86,2%
EVLD4	75,14	71,21	14,39	13,22	91,3%	94,6%	71,1%	81,7%
EVLD5	79,65	73,78	17,80	14,86	96,8%	98,0%	87,9%	91,9%
EVLD6	76,65	73,00	15,43	14,34	93,1%	97,0%	76,2%	88,7%
EVLD7	79,18	73,33	17,55	14,52	96,2%	97,4%	86,7%	89,8%
EVLD8	79,48	73,22	17,83	14,38	96,6%	97,3%	88,1%	89,0%
EVLD9	78,27	73,32	17,15	14,83	95,1%	97,4%	84,7%	91,7%

EV: LIFE EXPECTANCY

EVLEC: CHRONIC DISEASES FREE LIFE EXPECTANCY

EVBS: HEALTHY LIFE EXPECTANCY

EVLD: DISABILITY-FREE LIFE EXPECTANCY

EVLD1: SEVERE DISABILITY-FREE LIFE EXPECTANCY

EVLD2: HELP REQUIRED DISABILITY-FREE LIFE EXPECTANCY

EVLD3: DAILY LIFE ACTIVITIES DISABILITY-FREE LIFE EXPECTANCY

EVLD4: MOBILITY DISABILITY-FREE LIFE EXPECTANCY

EVLD5: SELF CARE DISABILITY-FREE LIFE EXPECTANCY

EVLD6: HOME ACTIVITIES DISABILITY-FREE LIFE EXPECTANCY

EVLD7: VISION DISABILITY-FREE LIFE EXPECTANCY

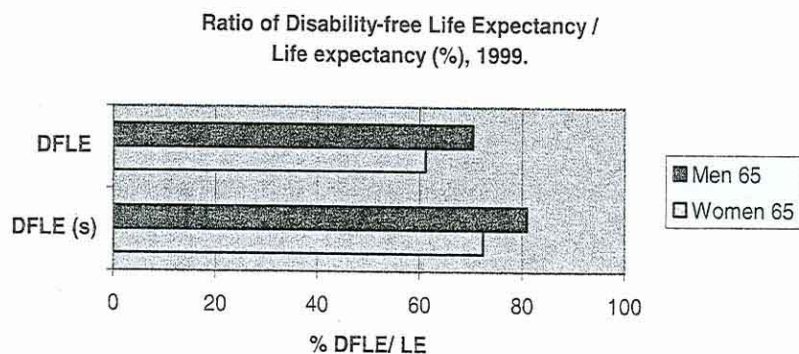
EVLD8: LISTENING DISABILITY-FREE LIFE EXPECTANCY

EVLD9: MUSCULOSKELETAL DISABILITY-FREE LIFE EXPECTANCY

Source:

INE. Encuesta sobre Discapacidades, Deficiencias y estados de Salud 1999. Detailed National Results. Madrid, 2002.

Figure 8:



As discussed above, there is a higher amount of women with disabilities respect to men from a certain age. This is due to a double effect: Differential women disability and differential men mortality. Both factors contribute to a feminization of disability.

2.3 Causes of death and Burden of disease

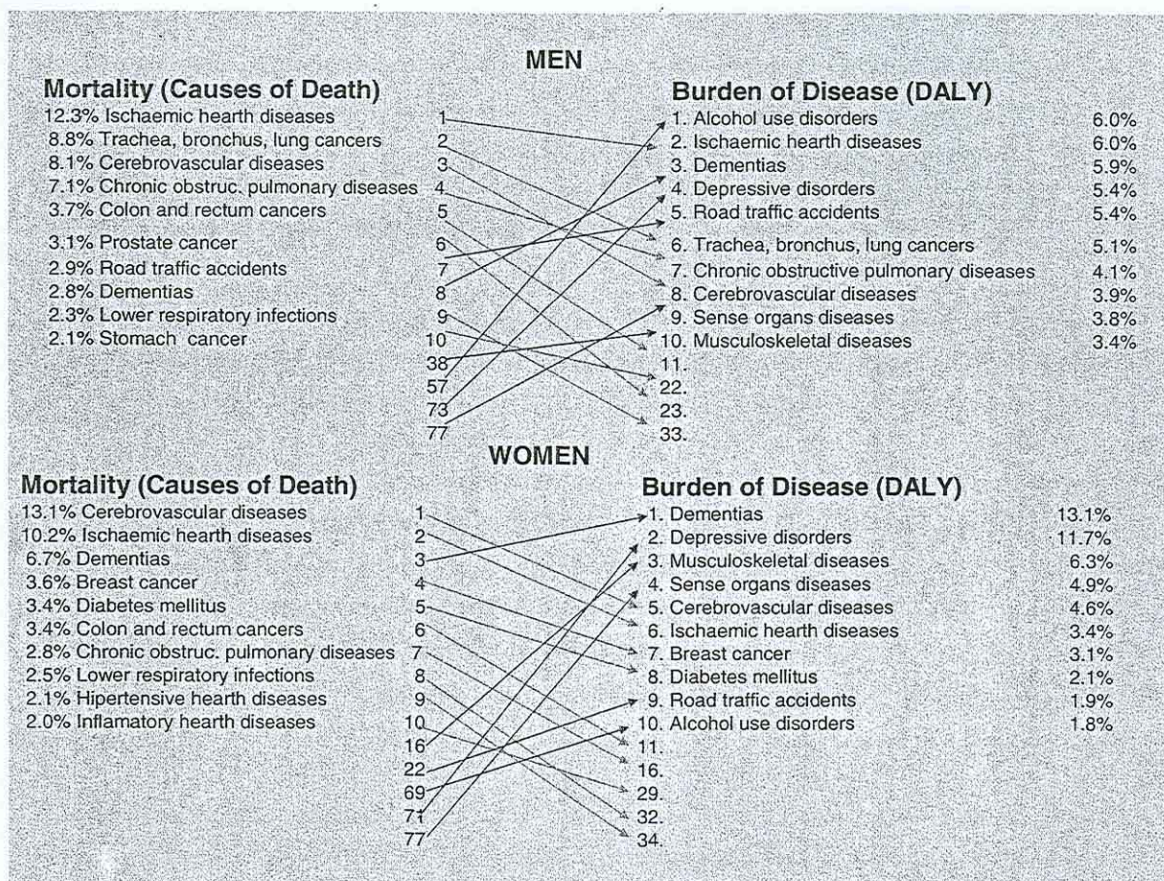
Adding years of life does not necessarily correlate with healthy years. This is a recurrent statement that we have clearly defined in the differential state between men and women. This evident observation is also supported by the analysis of the Burden of disease, by comparison of those main causes of death with those that do not kill, but reduce the capabilities to carry out activities and lower the health quality. Let us take 10 causes of each type for one year at the end of the studied period, the year 2000, differentiating those specifically affecting to each gender (Génova-Maleras et al., 2005).

The method used for the Burden of disease is described in the Sources and Methods section (Murray and López, 1996; Schopper et al. 2000), and it has been applied for the Spanish case by Génova-Maleras (Génova-Maleras et al, 2000; Alvarez et al, 2004).

The five main causes of death for men population (Figure 9) are Ischaemic heart diseases, Trachea, bronchus and lung cancers, cerebrovascular diseases, Chronic obstructive pulmonary diseases (COLD), and colon and rectum cancers. If we now look into the disability adjusted life years (DALY), we only find Ischaemic heart diseases in the second place, together with Alcohol use disorders, and followed by Dementias, Depressive disorders and Road traffic accidents. This would be also followed in the list of the Figure 9 to represent the difference between the profile of the causes that decrease years of life of the population respect to those that lower the quality of life during those years.

The profiles of the causes of death and the causes of DALY in women are also different. From the five main causes of death (Cerebrovascular diseases, Ischemic heart diseases, Dementias, Breast cancer and Diabetes mellitus), only Dementias and Cerebrovascular diseases are present in the upper positions of the Burden of disease, including also depressive disorders, musculoskeletal, and sense organs diseases. It is important to stress these profound differences, as well as the different profiles shown in the case of men and women.

Figure 9:



It is also noteworthy that if this hybrid indicator of mortality and disability by injuries and disease is disaggregated into the two components (mortality, as years of life lost (YLL) + disability, as years lived with disability (YLD)), we observe that men are quite equilibrated (1,385,959 – 50.8%) respect to (1,344,627 – 49.2%), while in women the weight of disability (1,420,562 - 62.9%) is much higher than that of mortality (836,713 - 37%). These results are consistent with those presented above using other indicators.

The results obtained so far have important consequences for the planning and prevention in Health systems, as well as for Social services. They are especially relevant in the context of prevention policies designed to reach the objective of longer, but also healthier, life in any population.

DISCUSSION

The results obtained in our analysis of health and longevity of the Spanish population are consistent with the main impact of the final stage of the epidemiological transition, namely that one in which the profile of the ageing pyramid determines the trends and characteristic evolution of the morbidity and disability transitions.

We have limited the use of homogeneous mortality indicators, as they are not sensitive enough to measure health, although we have not yet the required tools to capture the reality in the population health conditions. This is caused by the heterogeneous methodology available to perform either a synchronic analysis at the international level, or an analysis of the evolution for a single country. Our particular limitations were derived from the absence of a chronological series to get an insight into the trends, a knowledge that would allow to verify –or reject the different theoretical approaches already proposed for the disability and health transitions in an ageing population.

Another important limitation is the difficulty to extend the analysis for the older-old. Statistical limitations have led to the aggregation of the trends from different groups, thus mixing the real measurement with the artifactual impact due to the age structure of those populations.

Nevertheless, and within the limits imposed by the available sources, the results obtained show that, after the advances during the second half of the XXth century in health and longevity, the self-perceived health has a trend towards stability. From the middle 1980's healthy life for Spaniards has increased slightly considering the period as a whole. The period nevertheless has not been homogeneous, and the trend of the HLEP is not regular, and even during the last few years we could even consider a certain equilibrium, or a very slight decrease. This process is not followed identically by men and women.

Oscillations leading to alternate years with increments and losses in health, morbidity and disability of advanced populations from the demographic point of view, could be due (as it happen with the mortality transition) to the feedback relationships between population health and the social context. The advances or drop backs in the scientific-medical context, the social, economic, cultural and technological environment produce modifications in the trends that could be recover during the subsequent favourable period.

Regarding the measure of the evolution of disability using DFLE and severe DFLE, we can only offer a description corresponding to the end of the XXth century, where the most relevant feature is the clear feminization of the disabled population. Also, we note that there is a remarkable difference between the profiles of diseases causing death and those generating disability (DALY). Again, both groups of causes are very different if we consider either men or women.

Although from our study we can not get a conclusive trend for disability in Spain, we can mention that in the last report EHEMU from the ECHP, Carol Jagger considers that during the period 1995-2003 the life spent disability-free at age 65 + by gender follows a stability trend (EHEMU, 2005). If we consider disability (DFLE) as an indicator of the severity of morbidity, and the HLEP as an indicator of the health, the above referred oscillations in both indicators could reflect the interplay among the advances in mortality and the control of morbidity. This scenario makes possible a stabilization of disability, with periods of losses in health condition within a defined context. Consequently, we could say that we are in a period characterized by a dynamic equilibrium (Manton, 1982). The extent of this stability period in the Spanish society will depend upon the group of

changes of different nature that would eventually upgrade towards an additional step to reach a new stage in the disability transition.

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