Are we living longer but less healthy? Trends in mortality and morbidity in Catalonia (Spain), 1994-2011

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Abstract

Evidence on trends in prevalence of disease and disability can clarify whether countries are experiencing a compression or expansion of morbidity. An expansion of morbidity as indicated by disease have appeared in Europe and other developed regions. It is likely that better treatment, preventive measures and increases in education levels have contributed to the declines in mortality and increments in life expectancy. This paper examines whether there has been an expansion of morbidity in Catalonia (Spain). It uses trends in mortality and morbidity from major causes of death and links of these with survival to provide estimates of life expectancy with and without diseases and functioning loss. We use a repeated cross-sectional health survey carried out in 1994 and 2011 for measures of morbidity; mortality information comes from the Spanish National Statistics Institute. Our findings show that at age 65 the percentage of life with disease increased from 52% to 70% for men, and from 56% to 72% for women; the expectation of life unable to function increased from 24% to 30% for men and 40% to 47% for women between 1994 and 2011. These changes were attributable to increases in the prevalences of diseases and moderate functional limitation. Overall, we find an expansion of morbidity along the period. Increasing survival among people with diseases can lead to a higher prevalence of diseases in the older population. Higher prevalence of health problems can lead to greater pressure on the health care system and a growing burden of disease for individuals.

Keywords: healthy life expectancy, diseases, physical functioning, Spain.

Introduction

In recent years, researchers have tried to understand whether the ideal of living longer and healthier lives will be accomplished. Mortality and morbidity research is crucial to address such a complex issue. Many countries have experienced a continuing decline in mortality during the past half-century, influenced by overall reductions among older individuals after retirement age (Vaupel et al. 1998; Robine 2011; Janssen and Kunst 2005) with an increasing chance of surviving to the fourth age (Baltes and Mayer 1998). In the future, mortality changes at very old ages will be compelling due to mortality declines from cardiovascular and respiratory diseases, which are attributable to medical prevention, better treatment of diseases, and increases in education levels (Crimmins et al. 2010). However, living to older ages has raised the question of how healthy longer life will be. Surprisingly, countries experiencing longer lives at very old ages, e.g. southern European countries, do not appear to have better health and they often rank among the worst in indicators of disability. For instance, Spain is one of the European countries with the longest life expectancy at birth in 2009 (HMD 2013) but the highest levels of functioning problems (Solé-Auró and Crimmins 2013), coupled by facing a wave of increasing financial and social costs of long-term care (Alcañiz et al. 2011).

Taking into account these demographic and health changes, our work tries to understand whether this long life is being accompanied by an increase in time living in good health, examining changes in the prevalence of diseases and loss of mobility along with change in mortality in a Mediterranean region of over seven million people (Catalonia, Spain). In order to clarify whether there have been changes in the transition from health to disease or mobility limitations, we will look at three chronic conditions which can result in death, as well as mobility limitations, and link these with mortality. Hence, we will provide estimates of life expectancy with and without these conditions during the last two decades. In the following sections we summarize the recent general trends in health, morbidity, disability and mortality, paying special attention to Spain. We begin with a discussion of the dynamics of health to see whether there is a redistribution of disease and disability in the latter stages of life. Afterwards, we study trends in major diseases and mobility limitations, and we compute healthy life expectancies linked to disease and disability. In the end, our main aim is to investigate the implications of changes in the prevalence of conditions on the length of life with and without disease and mobility limitations in the life table population.

The dynamics of health at old ages

As Gruenberg (1977), Manton (1982) and Fries (1980) pointed out thirty years ago, mortality declines at older ages could be due to: 1) an expansion of morbidity (people live longer, but less healthy), 2) a compression of morbidity (death is delayed, disease starts later), or 3) a dynamic equilibrium between increased prevalence of disability and a reduction in its severity. These three theories have contributed to the development of further research on health trends (Robine and Michel 2004) and are important for service planning, since the three imply quite different pressures on health systems and services.

The optimistic point of view of aging proposed by Fries (1980), a compression of morbidity, pointed out that morbidity is compressed into a shorter period before death, increasing the proportion of life free of disease. There is now an open debate about this theory within a large body of research in demography, epidemiology and public health. In the 1990s, an increase in life expectancy was accompanied by an increase in time lived without disability (Cai and Lubitz 2007) or moderate limitations (Graham et al. 2004), indicating a dynamic equilibrium, as only a small delay in the onset was found. In the early 2000s, a continuation of the dynamic equilibrium of the 1990s (Cheung and Yip 2010; Galenkamp et al. 2012), and an emerging expansion in some forms of severe disability in the older populations were observed (Hashimoto et al. 2010). Thus, there was an expansion of morbidity by diseases in the late 1990s and early 2000s as the prevalence of chronic diseases and some risk factors appear to have been increasing in both Europe and other developed regions (Gutiérrez-Fisac et al. 2002; Crimmins and Beltrán-Sánchez 2011). Spain, like other countries (Freedman et al. 2004; Cambois et al. 2008), experienced a compression of disability since the 1980s (Sagardui-Villamor et al. 2005). For diseases, most prevalences in the Spanish population have risen until advanced ages (Martínez-Beneyto et al. 2011). Further investigation will provide evidence on survival and morbidity trends in Spain.

Trends in diseases

At the beginning of the past century, infectious diseases accounted for the majority of deaths, but now chronic diseases dominate. Due to medical improvements people often live with diagnosed diseases for long periods of time. Cardiovascular disease (CVD) is a major health problem across the world and is now responsible for approximately one-third of the deaths in both developing and developed countries (Deaton et al. 2011). CVD among European populations is mainly attributable to classical risk factors such as diets high in saturated fats, elevated cholesterol, hypertension, diabetes, smoking and sedentary lifestyle. However, it is important to notice that developed countries have enjoyed substantial mortality declines in CVD (O'Flaherty et al. 2013; Bhatnagar et al. 2011). Within Europe, southern European countries are better off in terms of CVD mortality risk than those in the north. CVD in Spain has also experienced a downward trend (Ruiz-Ramos et al. 2008), and it now represents the second lowest coronary mortality rate in Europe after France (Sans et al. 1997).

Hypertension is one of the most prevalent universal risk factors, especially in patients with established CVD, and accounts for 6% of deaths worldwide (Murray and Lopez 1997). Around 11% of all disease burden in developed countries and about a quarter of European heart attacks are due to hypertension, while hypertensive individuals have twice the risk of experiencing heart attack compared to those without a history of hypertension (Nichols et al. 2012). The treatment of hypertension has improved dramatically over the past decades, contributing to the reductions of mortality incidence due to CVD. In Spain, substantial efforts have been made to diminish hypertension rates (Llisterri et al. 2012); however, the treatment strategy adopted has not been enough to slow down the increases through the last decade (Cordero et al. 2011).

Diabetes is another chronic disease that substantially contributes to increase the risk of CVD, and also magnifies the effect of other risk factors (cholesterol levels, raised blood pressure, smoking and obesity). People with diagnosed diabetes have three times the risk of a heart attack compared to those without (Nichols et al. 2012). Diabetes trends in Europe are alarming, given the notable increase in prevalence in most countries (Passa 2002). Spain is not an exception and diabetes has become an important public health problem because of its growing magnitude and its impact on CVD (Ruiz-Ramos et al. 2006). A combination of several factors, such as changes in the diagnostic criteria for diabetes, population aging, and lower mortality among persons with diabetes, has led to the rise in increases in the disease (Valdés et al. 2007).

Other diseases, such as cancer, play an important role in mortality and morbidity research, tough they will not be examined in this study due to lack of data. Cancer is the leading cause of death in developed countries, and the global burden of cancer continues to increase (Jemal et al. 2011). During the past decade, many changes in the occurrence, survival, and mortality of cancer have occurred. In Europe, the total number of cancer cases is growing due to the aging of the population (Malvezzi et al. 2012), but mortality from major cancers has fallen because of the continuing progress in prevention, early detection, and better control of co-morbidity, as well as the recent large reductions in smoking prevalence among males (Karim-Kos et al. 2008). Important improvements in cancer survival have been achieved in southern and central Europe, where survival rates have been traditionally lagging behind compared to the rest of European countries (Coleman et al. 2003). Cancer prevention and management in Europe is moving in the right direction by increasing the chance of survival and cure among those who do develop cancer. Since the mid 1990s Spanish cancer mortality rates decreased about 12% for both genders (Regidor et al. 2009).

Disability and physical functioning trends

The first studies on disability appeared in the late 1960s and 1970s with a general conclusion that disability did not decrease during this time period (Wilmoth 1997; Kaplan 1991; Crimmins et al. 1997). Later on disability declines were reported, particularly for the older population and during the 1980s, in developed countries like Japan, the United States, or France (Jacobzone et al. 1999; Robine et al. 2002). In the 1990s, the worldwide rates of disability indicated a dynamic equilibrium between prevalence and severity (Parker and Thorslund 2007; Moe and Hagen 2011; Crimmins et al. 2009), and mixed patterns have appeared in recent years. The disability distribution within Europe is not uniform. Some European countries have accomplished an expansion of disability among mid-adults (Cambois et al. 2012; Lafortune et al. 2007), while other countries, like the Netherlands, have experienced high and stable prevalence of disability. However, disability rates are expected to increase in the future due to the aging of the population (Picavet and Hoeymans 2002). Southern Europeans are expected to spend a higher percentage of their lives with disability compared to the people from the north (Minicuci et al. 2004). For instance, Spain experienced a compression of disability and the postponement of severe disability onset to more advanced ages from the 1980s to the present (Zunzunegui et al. 2006; Sagardui-Villamor et al. 2005).

In the progressive deterioration of health, the mobility limitations that people suffer at old ages are an anticipated stage before the development of disability. The trends in prevalence of functioning problems have reported reduced functioning ability of people approaching old ages in the early 2000s (Martin et al. 2010; Lakdawalla et al. 2004). These results contrast unfavorably with the ones obtained two decades ago, particularly in the U.S., when research showed improvements in physical functioning problems in the 1990s (Crimmins 2004). However, there is a less clear worldwide pattern between the 1990s to 2000s. For instance, in the 1990s, increasing functioning limitations were found for England, while reduced prevalences appeared among older Norwegians, and stable rates were seen in the Netherlands (Moe and Hagen 2011; Martin et al. 2012; Hoeymans et al. 2011). Knowing these trends is crucial, because an increase in the number of older persons may raise the demand for health care services, whereas decreasing prevalences of functioning limitation among them may counteract this demographic effect.

Methodology

Data

We used data obtained between 1994 and 2012 from the Catalan Health Survey (ESCA) (Generalitat de Catalunya 2013). The Department of Health in Catalonia (Spain) – a highly populated Mediterranean region located in the northeast corner of the Iberian Peninsula – is responsible for the technical execution of the project (e.g, sample design, questionnaires). The ESCA is the only source of micro data for Catalonia, containing information on morbidity in relation with socio-demographic variables, health behaviors and individual's state of health. The sample follows a stratified design, based on age, gender and geographical area. The random collection of the data is performed using personal interviews. The questionnaires of each time-period are designed to be comparable.

This cross-sectional survey was collected in 1994 and continuously during the period 2010 to 2012 (Alcañiz et al. 2014). In the last time period we combined data of the last three year's available (2010, 2011 and 2012) to increase our sample size, and considered 2011 our midpoint year. Hence, when we refer to the year 2011 in our analysis, we include data from the years 2010, 2011 and 2012. Our sample is comprised of 20,433 Catalan non-institutionalized residents (12,584 people in 1994 and 7,849 people in 2011) randomly selected aged 15 years and older. Because mortality is not appended to the ESCA, mortality information came from the official life tables from the Spanish National Statistics Institute database (INE 2012).

Measures

We use three indicators of the presence of chronic diseases: hypertension, diabetes and heart disease. Similar question wording is reported in the two time periods in response to the question: "Do you have or has a doctor ever told you that you have any of the following conditions…?", followed by a list of chronic medical disorders including hypertension, diabetes and heart disease. Unfortunately, data regarding cancer were not collected in 1994, so we cannot include this disease between the ones studied here.

In this survey, people also reported whether they had difficulties or limitations to perform a set of mobility functions. We have chosen an indicator of mobility limitations based on a positive answer (yes versus no) to at least one of these three items: 1) mobility problems, such as the inability to move out of the house without receiving help from another person, 2) walking problems, that may require using special equipment, and 3) other important mobility limitations, such as the difficulty to walk up and down a flight of stairs, and standing, without using special equipment.

The interest of studying both chronic diseases and mobility functions is to see how and when such hazardous health conditions appear in the pathway of human life span, and how long they last until death ensues. It is worth noting that having more chronic diseases may cause functional limitations in the population, and therefore, an activity limitation.

Statistical analyses

We first examine recent changes in the prevalence of diseases, which are prominent causes of mortality at older ages, and the presence of mobility limitations. Healthy life expectancy is estimated using the *Sullivan* approach (Sullivan 1971), a prevalence-based method of dividing life-table years lived in an age interval, into years with and without health disorders, based on the specific health prevalence of that age group. We also show 95% confidence intervals for estimated life expectancy with and without conditions (Jagger 1999). Using the healthy life expectancy calculations, we compute the expected age that chronic diseases or mobility limitations appear in life by gender in each time period. Analyses were conducted using Stata software, version 12 (StataCorp).

Results

Prevalences of diseases and functional limitations

Table 1 shows the percentages of people with hypertension, diabetes and heart disease, and ensuing mobility limitations. Results are stratified by age groups and gender over time. Error margins may be constructed based on statistical sampling analysis (Kish 1995; Levy and Lemeshow 1991). If we set a 95% confidence level, estimated sampling errors are around ±3% for all percentages, except at the older ages, where samples are smaller and the errors range between ±5% and ±7%.

[Insert Table 1 about here]

Prevalence of hypertension increased over time, while gender differences exist between periods. For men, prevalence of hypertension increased in the almost two-decade time period, except at younger ages (15-39) where rates are low and differences between periods are not statistically significant. After age 60, the percentage of males with hypertension is similar with age. This could indicate a dynamic equilibrium among men if some individuals have been diagnosed with hypertension later in life and are balanced with those that were diagnosed at younger ages

and already died. This is not the case for women, who survived longer with diseases, and show significant increases after age 60 over time.

Diabetes is our second chronic disease and significant increases are seen between 1994 to 2011 through much of the adult age range for males (50-plus) and only in older ages for females (80-plus). Increments of diabetes rates are seen with age, growing similarly for men and women. Gender differences are only significant in the range 50-79 for 2011, showing lower percentages of disease for women. It could be stated that for ages 50-plus the onset of diabetes is a whole decade earlier for men compared to women. Diabetes rates diminish for both genders after age 70 in 1994. This is not the case in recent dates, where prevalence for men is steady after age 70, and even grows for women.

Our third health condition is heart disease. In both periods, the prevalence of heart disease rises as individuals get older. Such increments until very old ages may be a result of early detection plans, and as a consequence longer survival due to better treatment. Again, significant differences exist by gender over this period. Among men aged 70-plus, increases of heart disease prevalences are noticed in the two decade period, while this trend is not so clear for women. Women rates of heart disease are quite similar over time, with significant increases only after age 80.

Table 1 concludes with our mobility measure. The prevalence of mobility problems doesn't seem to stop increasing over time, a sign of longevity since more people are reaching older ages. Since this is a non-fatal health condition, the growing prevalence of mobility limitations directly influences the quality of life of older people. In general, rates of mobility limitations rise by age and gender over time, and higher levels are found for women than men almost at all ages. Seventy-plus is a critical age where mobility problems experienced a sharp growth.

Changes in healthy life expectancy: 1994-2011

Few analyses on healthy life expectancy in Spain or other Mediterranean countries have examined changes in life expectancy with disease or mobility limitations (Sagardui-Villamor et al. 2005). Figure 1 shows the increase in overall survival between 1994 and 2011. This curve indicates a rise on survival time over these years, so people are expected to live longer now than two decades ago. Figure 1 also shows the curves representing survival without mobility limitations and without diseases over time. For both genders survival curves without diseases are shifted leftward, indicating less time surviving without diseases. A particularity for women between ages 45 and 55 is seen as curves show more time surviving without diseases in recent periods. Survival curves without disease are much more linear than those for mobility limitations or full life, especially after age 40. This steady negative slope in the survival curve without diseases indicates that the onset of diseases after age 40 is not as concentrated in older ages as it is death. It is worth noting that survival curves without mobility limitations are closer to overall curves - more for men than for women -, showing that females spend a longer period of their late life accusing mobility problems. The curves indicating survival without mobility limitations are above those representing survival without diseases, meaning that mobility limitations occur at older ages in the whole population than the diseases we consider.

[Insert Figure 1 about here]

Table 2 gives the values of the expected lifetime with and without diseases and mobility limitations over time at 15 and 65 years of age. Confidence intervals are shown and due to large sample sizes their precision is quite good (hardly exceeding 1 year around the healthy life expectancy). Life expectancy increases along the whole period, showing faster increments in younger cohorts. At age 15, life expectancy increased 4.6 years for men and 3.2 years for women; at age 65, both genders show the same gain in life expectancy (2.5 years). Since we want to address how mortality and morbidity trends affect the lifetime of the population, and since the majority of health disorders appear late in life, we are going to further concentrate on the healthy life expectancy results obtained at age 65.

[Insert Table 2 about here]

Over time, men aged 65 experienced increments of life expectancy with disease (4.5 years), and consequently a decrease of years without disease (2 years). If we compare increases in men overall life expectancy with decreases in life expectancy without disease, we observe an expansion of morbidity: men live longer but the onset of disease is earlier. This trend is also true for women. This expansion can be easily seen when we look at the percentage of life spent with disease over time: at age 65, this percentage goes from 52% to 70% for men and from 56% to 72% for women. Similar patterns are observed at age 15.

In recent times we also see different patterns on the gender gap in life expectancy with diseases. Table 3 presents the expected age that health disorders appear by gender over time. For instance, in 2011, 15-year-old men will suffer from diseases a third of their life, starting, on average, at age 58.1; the same portion of men's life with diseases is identified for women, but they will start suffering from the diseases considered here later in life as they live longer (age 61.6). Therefore, 3.5 years was the gender difference in 2011; but only 1.4 years in 1994 (starting at age 62.1 for men and 63.5 for women). This gender gap decreases, but does not vanish, at older ages: 1.1 years in 1994, and only a scarcely significant 0.6 years in 2011. At older ages women's health declines more sharply than men's and the gap between genders fades out.

[Insert Table 3 about here]

Temporal patterns for mobility limitations are slightly different. At 65 the percentage of life with functioning problems has risen from 24% to 30% for men, and from 40% to 47% for women from 1994 to 2011. Men aged 65 in 1994 have experienced mobility problems at 77.3 years; in 2011 this activity limitation appears at 78, and women at age 65 have suffered mobility problems at 77.1 in both years (Table 3). Therefore, the ages of onset of impairment are very similar; thus we can conclude that there is no relevant gender difference concerning mobility limitations over time. There has been an expansion of life unable to function for both genders, but this expansion is not due to an earlier onset of mobility problems, but to the increase in life expectancy. It is also remarkable that the magnitude of this expansion mainly at older ages is much lower than the one for chronic diseases.

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Conclusion

Regarding the health of the population in Catalonia (Spain), we found that mobility limitations occur later in life than the diseases studied. These chronic diseases arrive earlier for men than women, while the onset of mobility limitations for those who were able to function at 65 appears at a similar age by gender at both time periods (Table 3). Specifically, the prevalence of hypertension increases over time, though part of these increments may be due to better health surveillance that makes people aware of the conditions they have (Howard et al. 2010). Concerning diabetes the fact that in recent dates prevalences do not decrease at old ages suggests that better monitoring and treatment have succeeded in avoiding premature death due to health complications caused by this disorder for both genders (Valdés et al. 2007). Part of the gender differences in heart disease may be explained, as pointed out by Flink et al. (2013), by the fact that women are less likely to know the symptoms of heart failure, which may delay requesting the medical services until life is already seriously compromised. Because life expectancy is longer for women than men, women will spend a higher portion of their lives with both chronic diseases and mobility limitations.

Our findings reveal an outstanding expansion of morbidity by disease along the period at the oldest age, as people live almost 5 years longer with diseases in 2011 than at the beginning of the 1990s. This expansion is attributable to both a longer life (mostly for women), and an earlier onset of diseases (especially for men), which translates to higher incidence as pointed out by Solé-Auró et al. (2013) in some European countries. Increasing survival among people with diseases has led to a higher prevalence of diseases in the Catalan population. As shown in Figure 1, our results may be picking up not only a higher risk of illness at younger ages, but an improvement in early control and diagnosis of diseases over the years. Due to the earlier onset of disease in the lifetime, individuals affected are not only the oldest, but also working age people. There is no evidence on whether earlier diagnosis of diseases is caused by a real deterioration of people's health at younger ages, higher incidence, or if it is somehow the product of better health control leading to earlier detection. It is likely that the rise in the prevalence of health disorders is mainly explained by better knowledge of the diseases, increased contacts with medical doctors, and screening campaigns. Either way, a scenario of a higher prevalence of diagnosed health problems and longer disease-specific survival can lead to a greater pressure on the health care system, compounded by the fact that in Spain this system is universal and provides appropriate basic health care coverage for all. This effect is lessened taking into account that early diagnosis helps prevent the arrival of advanced stages of the disease that often imply substantial medical expenses. In addition, regarding individual quality of life, a timely diagnosis usually implies medical care, which can extend their life in relatively good health, or at least lead to less severe illness. In sum, disease expands, although we can't assert that quality of life deteriorates because it may be an effect of decreased severity as a consequence of better monitoring of diseases, which would partially explain the increase of the proportion of years with disease. Concerning mobility limitations, little expansion between 1994 and 2011 is found for men and women at age 65, mainly caused by the increments in life expectancy and not by an earlier detection. Nevertheless, the growth on the demand of health care is not necessarily smaller than for diseases, because the expenses incurred depend on the severity of the disorders and need for care.

Gender differences are also relevant over time. Our results show an expansion of the gender gap in life expectancy with diseases at younger ages, but decreases at older ages. If the gender gap keeps decreasing at older ages, it may suggest that the mortality advantage of women is influenced by lower prevalence of the diseases we consider in earlier stages in the life cycle. The literature states several causes for these gender differences, such as hormonal differences (Pérez-López et al. 2010). In any case, it has to be taken into account that these results could change if we studied other diseases, such as cancer. Concerning mobility limitations, no relevant changes in gender difference appear over time.

Despite the Spanish advantageous position in CVD mortality rates within Europe, if we want a more healthy society with fewer diseases concentrated at the end of our life, it is important to work on prevention. The strong interrelation among hypertension, diabetes and heart disease contributes to increased risk of cardiovascular problems and magnifies the effect of several risk factors, such as smoking or obesity (Nichols et al. 2012). Much of the CVD burden worldwide is avoidable, but demands a global approach to prevention (Deaton et al. 2011). For instance, there is a wide field for preventive measures of diabetes and hypertension beginning with simple strategies of primary care, such as the control of body mass index (Lee et al. 2012). Thus, a good control of hypertension is relatively easy to achieve through a healthy lifestyle accompanied by medication in severe cases (Llisterri et al. 2012). Deterioration in mobility associated with old age could be delayed by educating people from youth about the benefits of a regular practice of physical exercise. Further thoughts are necessary on how to improve the key modifiable lifestyles or behavioral risk factors for CVD and functionning loss - smoking, dietary intake, and physical activity (WHO 2009). In fact, any improvement in the prevention or treatment of one of these diseases will have an overall positive effect over the individual health, and therefore over society as a whole.

There are some limitations to the present study that should be noted here. The investigation of disease incidence and longer survival with adverse health conditions would provide clarity, but no longitudinal data for Spain are available. The ESCA does not provide any indicator of disease severity, so we can not assert that quality of life related to health has been diminished. As we indicated above, cancer is another important disease to take into account, but our survey does not provide such information in the first year of our analysis. However, cancer does not directly interact with the diseases in this study and can therefore be analyzed separately. Moreover, since the institutionalized population is not included in our analysis, our findings apply only to the community-dwelling population. While we recognize these limitations, we believe that the analysis presented here is an important step in understanding the trends and dynamics in healthy life expectancy for almost the last two decades in a Mediterranean region.

Individual and population approaches are necessary for decreasing the global burden of health disorders. To do so, precise public health policies for specific individual sub-groups need to be implemented. Addressing societal factors that promote the development of unhealthy behaviors will lead to a better quality of life for individuals until advanced ages. Overall, we aim for better policies for better lives.
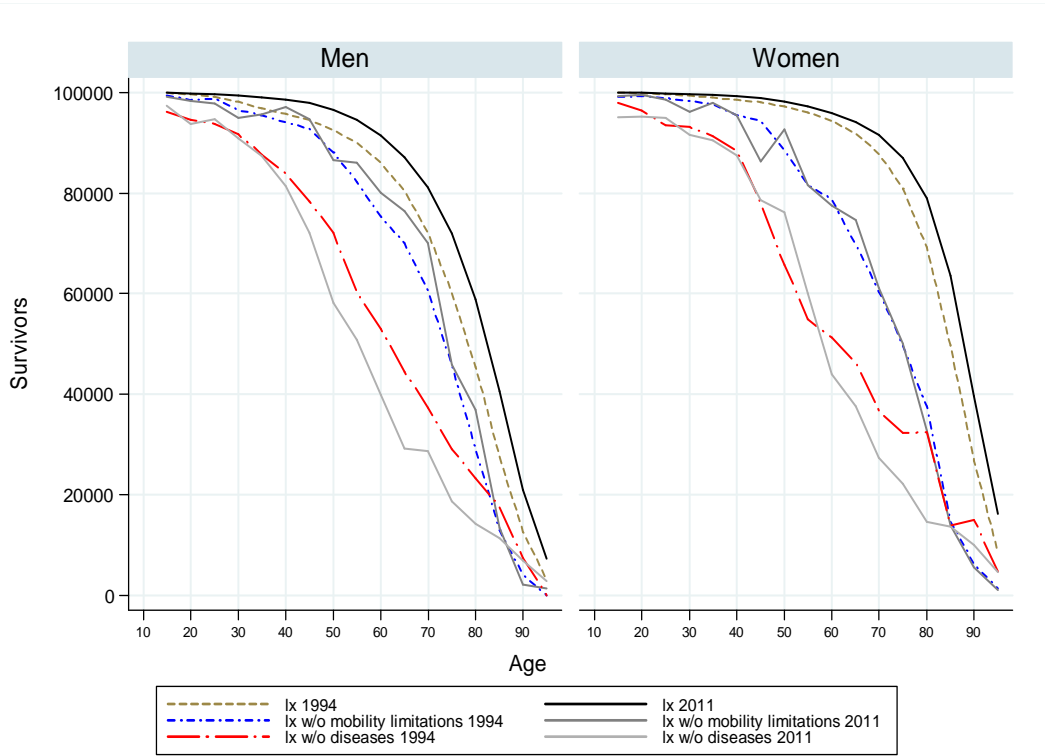
Acknowledgments

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Figure 1. Survivors in the life table population

Source: Life Tables from the Spanish National Statistics Institute

Table 1: Prevalence (percent) of diseases and mobility problems by age and sex in Catalonia (Spain). Individuals aged 15-plus

Age	Hypertension						Diabetes					
	Men			Women			Men			Women		
	1994	2011	Difference	1994	2011	Difference	1994	2011	Difference	1994	2011	Difference
15-29	2.8	3.5	0.7	1.9	3.3	1.4	0.6	0.4	-0.2	0.4	1.0	0.6
30-39	5.7	8.4	2.7	4.9	5.6	0.7	0.9	0.5	-0.4	0.5	2.8	2.3
40-49	10.9	19.6	8.7	10.7	11.6	0.9	2.4	3.2	0.8	3.0	4.5	1.5
50-59	19.2	36.0	16.8	29.8	24.6	-5.2	5.6	11.2	5.6	6.3	5.7	-0.6
60-69	28.2	49.4	21.2	36.8	48.9	12.1	12.3	18.7	6.4	12.5	13.9	1.4
70-79	29.9	53.5	23.6	45.5	62.0	16.5	12.0	22.7	10.7	13.0	15.9	2.9
80+	26.7	50.3	23.6	42.3	68.3	26.0	7.4	22.8	15.4	9.0	22.9	13.9

Age	Heart Diseases						Mobility Limitations					
	Men			Women			Men			Women		
	1994	2011	Difference	1994	2011	Difference	1994	2011	Difference	1994	2011	Difference
15-29	1.5	1.1	-0.4	1.5	1.1	-0.4	0.7	1.4	0.7	0.8	0.8	0.0
30-39	1.9	1.8	-0.1	1.8	1.4	-0.4	1.5	4.0	2.5	1.2	2.5	1.3
40-49	2.5	2.8	0.3	3.9	1.2	-2.7	1.7	2.4	0.7	3.4	8.0	4.6
50-59	7.9	6.0	-1.9	6.2	6.6	0.4	6.8	9.8	3.0	11.9	10.5	-1.4
60-69	13.0	17.8	4.8	11.6	11.3	-0.3	12.6	12.4	-0.2	20.1	19.9	-0.2
70-79	18.9	27.8	8.9	18.5	20.5	2.0	19.0	24.6	5.6	34.3	37.8	3.5
80+	22.7	36.6	13.9	22.6	30.9	8.3	44.5	52.0	7.5	57.4	69.5	12.1

Source: Catalan Health Survey, 1994 and 2011. Survey weights are used in this table.

Table 2: Life expectancy (LE), life expectancy with and without diseases, and life expectancy with and without mobility limitations for men and women: 1994 and 2011

	Men		Women	
	1994	2011	1994	2011
Age 15				
LE	60.2	64.8	67.5	70.7
Without disease	47.1	43.1	48.5	46.6
CI	(46.5, 47.5)	(42.1,43.9)	(47.7,49.3)	(45.5,47.5)
With at least one disease	13.1	21.7	19.0	24.1
% With diseases/LE	22	33	28	34
Able to function	55.5	57.5	57.6	57.5
CI	(55.1,55.9)	(56.7,58.0)	(56.9,58.1)	(56.7, 58.2)
Unable to function	4.7	7.3	9.9	13.2
% Unable to function/LE	8	11	15	19
Age 65				
LE	16.2	18.7	20.2	22.7
Without disease	7.7	5.7	8.8	6.3
CI	(8.1,9.0)	(4.9,6.3)	(8.1,9.5)	(5.5,7.1)
With at least one disease	8.5	13.0	11.4	16.3
% With diseases/LE	52	70	56	72
Able to function	12.3	13.0	12.1	12.1
CI	(11.9,12.7)	(12.3,13.5)	(11.5,12.6)	(11.3,12.7)
Unable to function	3.9	5.7	8.1	10.6
% Unable to function/LE	24	30	40	47

Source: Catalan Health Survey, 1994 and 2011. Survey weights are used in this table. LE: Life expectancy. CI: Confidence intervals. Chronic diseases include hypertension, diabetes and heart disease. Mobility limitations include: 1) mobility problems, such as the inability to move out of the house without receiving help from another person, 2) walking problems, that may require using special equipment, and 3) other important mobility limitations, such as the difficulty to walk up and down a flight of stairs, and standing, without using special equipment.

Table 3: Expected age that chronic diseases or mobility limitations appear for men and women: 1994 and 2011

	Men		Women	
	1994	2011	1994	2011
Chronic diseases				
Age 15	62.1	58.1	63.5	61.6
Age 65	72.7	70.7	73.8	71.3
Mobility functioning loss				
Age 15	70.5	72.5	72.6	72.5
Age 65	77.3	78.0	77.1	77.1

Source: Catalan Health Survey, 1994 and 2011. Chronic diseases include hypertension, diabetes and heart disease. Mobility limitations include: 1) mobility problems, such as the inability to move out of the house without receiving help from another person, 2) walking problems, that may require using special equipment, and 3) other important mobility limitations, such as the difficulty to walk up and down a flight of stairs, and standing, without using special equipment.

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Canova, L., **Vaglio, A.**
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"Prevalence of alcohol-impaired drivers based on random breath tests in a roadside survey"
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