Regional development and mortality decline in Spain (1860-1950).
(Abstract)

This paper aims to understand the process of the epidemiological transition in Spain from a spatial viewpoint. A sustained tradition exists of studies on the mortality decline in the 20th century in Spain with particular attention addressed to child mortality (Pascua 1934, Arbelo 1962, Gómez Redondo 1992). However, this research has been also expanded beyond this age group, because of the reconstruction of provincial and regional life tables for the first third of the 20th century (Dopico, Reher 1998) and around the years 1960 and 1970 (Blanes, 1996). At the same time, the growing concern on the study of the role played by some aspects such as economic (Reher, Sanz Gimeno 2000), regional (Dopico 1986), medical or cultural factors (Berbaneu Mestre 1994) must be kept in mind in the explanation of that general trend of mortality decline. This paper continues previous research on the exploration of mortality determinants in Spain in the 19th and 20th centuries (Cussó, Nicolau 2000, Muñoz Pradas 2004). It introduces, firstly, the main features of mortality transition in Spain (levels, chronology and causes of death); secondly, it explores relationships between mortality and economic development at a regional level from 1860 to 1975 and, thirdly, it analyses and compares spatial patterns of mortality and their determinants at the provincial level in two different years: 1860 and 1950. The main sources of data come, on one hand, from published estimations of levels and trends in mortality and economic performance of the Spanish economy and regions and, on the other, from our estimations of mortality levels (for provinces) based on vital statistics and one set of economic, social and environmental indicators elaborated from censuses and other statistical sources. Demographic statistics have been used after a process of evaluation and data correction. The improvement on surviving under the age of 15 explains the increase of approximately 60 percent life expectancy in the Spanish population between 1900 and 1960. Because of that, and the different behaviour of mortality in childhood and adulthood, the mortality estimations are from the under 15-year-old population (both sexes). The units of analysis are the Spanish provinces. The methodology implemented is based on mapping demographic, social and economic indicators and the application of standard multivariate techniques for quantifying the effects of a set of selected variables on probabilities of dying under 5 and 15 years of age.

The modern epidemiological transition began in Spain in around the third decade of the 20th century (Arango, 1987). In 1930, life expectancy at birth (e(0)) was 45 years, infant mortality ((1)q(0)) was more than 150 per thousand at that time, the average life expectancy at birth in Europe was 54 years. But, in countries with low mortality rates, levels of infant mortality were around 100 per thousand, life expectancy at birth more than 60 years and infectious diseases were responsible for 30 percent of all deaths (Caselli, Meslè and Vallin, 1999). Given this, it is quite obvious that Spanish mortality in the 19th century should be a kind of traditional mortality pattern (Pérez Moreda, 1999). Mortality estimates from vital statistics and one population census from around 1860 show an e(0) of 30 years and a (1)q(0) of 244 per thousand. The end of the first stage in the modern epidemiological transition could be placed around 1960, when the main composition of traditional causes of death had already changed. For example, traditional illnesses in childhood accumulating 22 percent of all deaths in 1930 were reduced to 7 percent in 1960 or respiratory diseases, around 25 percent, decreased to 15 percent (Keyfitz et al. 1972). A first step in that trend was seen around 1950 when four infectious diseases like diarrhoea, pneumonia, bronchitis and meningitis represented less than 45 percent of all deaths under the age of 15. Twenty years before, i.e., 1930, this value reached 52 percent. Results from

research on the Spanish mortality decline in the 20th century allow us to set up the basic chronology and geography of that transition. Thus, we know that main turning points in that process are at the end of the 19th century, between 1920 and 1930 (e(0) increases from 41 to 50 years of age) and from 1940 (e(0)=50 y.) to 1950 (e(0)=61y.). From a spatial viewpoint, this decline has involved, on one hand, a convergence in the mortality levels on a regional and provincial level and, on the other, a change from north to east in the area of low mortality at the same time as the central and southern areas of the Iberian Peninsula remain as territories of high mortality. All these aspects suggest to us that a comparison between 1860 and 1950 would be a good approach for understanding the spatial mortality determinants of the first stage in the modern Spanish epidemiological transition.

In spite of some shortcomings and limitations in regional economic data, a reconstruction of the levels of GDP per capita in the historical regions of Spain at different points of time is now available (Alvarez Llano 1986, Carreras 1990, Martínez Rodriguez 1990, Alcaide 2003). A bivariate plot between mortality and that economic indicator by region shows a pattern very close to some other results (Japan as the best example, Mosk, Johansson 1986): the slope of the line shifts as economic development goes forward. In the mid-nineteenth century, a negative relationship between those two indicators can be observed but around 1910 it became positive. A positive slope means that the wealthiest regions are also places with the lowest levels of mortality. This positive slope remains until 1950, but it vanishes between that year and 1975. This course of evolution seems also quite independent of the modern phases of economic growth. Stagnation or cycles of economic crises do not involve any change in that long-term trend. Provincial data on wealth –from tax records-, on one hand, and estimations of GDP per capita, on the other, around 1860 and 1950 show the kind of different slopes mentioned above.

Epidemiological transition theory has been much more expounded in a "nation-centred" framework rather than a region-centred one. Thus, the mortality changes used to be analysed more at a national scale; however, some new evaluations of that approach are taking into account that sub-national level (Vallin, Meslé 2005). The process of mortality decline involves a changing geography, that is, a process of spatial redistribution of mortality levels and structures that does not exist in a similar way at the national level. An explanatory framework will be introduced in the third part of the paper in order to explain the evolution of geographical patterns of mortality. This framework approaches mortality decline from a spatial perspective as a change in the geography of mortality risks. This is a process that is expressed through three main areas: regional economic modernisation, growth of the sanitary and public health sector and demographic changes (fertility decline and migratory movements). A set of explanatory variables related to those three dimensions are evaluated and tested around 1860 and 1950. Preliminary results show that, in the 19th century, mortality determinants are not only purely environmental and that some forms of economic organisation and fertility behaviour have an important role in understanding spatial patterns of mortality. Nearly a century later, the material benefits of the economic development –only suddenly interrupted by the Civil War- and the consequences of public health interventions can be tested having a positive effect on the improvement of people survival. However, it is quite interesting to confirm that, in spite of the generalised fertility decline in the Spanish provinces since 1930, fertility is still playing a major role in the determination of mortality levels for children under the age of 5. The study of mortality determinants up until the age of 15 confirms previous results but reports a lower effect of some economic variables at the same time that it suggests a significant impact of mortality conditions experienced in childhood between 10 and 20 years before.