What happened to life expectancy in Spain in the 1980s?

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Abstract

Background—Life expectancy at birth in Spain improved between 1972 and 1982, by
2.5 years for males and 3.2 years for females. This slowed considerably in the
following decade, with increases of only
0.5 and 1.7 years respectively.

Objective—To determine the causes of
death that have been responsible for the
failure by Spain to maintain in the 1980s and 1990s the rate of improvement in life
expectancy seen during the 1970s.

Design—Data from WHO mortality tapes
grouped in a series of clinically meaningful
categories were used to calculate the
contribution of each category, in five year age
groups, to the changing life expectancy
at birth in the two periods.

Setting—Spain.

Results—The trend in life expectancy at
birth in Spain over this 20 year period can
be considered to have two components,
both with important consequences for
public health policy. Underlying trends
include a steady negative contribution
from respiratory cancer in men and a
reduction in cardiovascular disease. More
recent trends include a considerable deter-
rioration in deaths among young adults,
most notably from accidents and, possibly,
AIDS.

Conclusion—The failure to maintain the
rate of earlier gains in life expectancy in
Spain can be attributed largely to a few
conditions, although these may indicate
less obvious underlying problems. These
findings have important consequences for
prioritising public health policies.

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In studies of the health of populations, the
countries of southern Europe have been
noteworthy because of their relatively good
performance, as assessed by measures of health
status. Spain, Italy, and Greece have some of
the longest life expectancies at birth in the
European Union. Several reasons have been
advanced to explain this, with the role of the
Mediterranean diet attracting particular atten-
tion. But an examination of recent health indica-
tors suggests that this impression of a healthy
Mediterranean environment may no longer be
justified, at least in the case of Spain. In the 10
years between 1982 and 1992, male life
expectancy at birth increased by only 0.5 years,
a much lower figure than the 2.5 year improve-
ment seen in the preceding 10 years period (fig
1). Indeed, if the period between 1976 and
1982 is considered alone, the rate of increase
was even greater.

Composite demographic figures, such as life
expectancy at birth, simply indicate the exist-
ence of a problem, such as a change in trends,
but say nothing about its causes. This paper is
a first step in advancing our understanding of
what has been happening in Spain since the
1970s. It identifies the contribution of deaths
from specific causes and at different ages to the
change in life expectancy at birth between
1972 and 1982 inclusive on the one hand, and
1982 and 1992 inclusive on the other. The later
period has been chosen to capture the period
from when life expectancy ceased increasing to
when the most recent data are available. The
former period is of the same duration prior to this.

Methods

The study analysed mortality data from the
World Health Organization mortality tapes,
classified according to the 8th and 9th revision
of the International Classification of Diseases
(ICD-8, ICD-9). For the year 1972, a propor-
tional repartition of deaths at unknown ages
was performed. Life tables for both sexes were
constructed using standard techniques. The
abbreviated causes of deaths were brought
together to create a smaller series of clinically
meaningful categories (table 1). These were
selected using the criteria of numbers of deaths
and association with known risk factors. The
contribution of each of these categories at each
5 year age group (although the 0 to 1 age group
was analysed separately) to the difference in life
expectancy at birth at the beginning and end of
the two periods, and for each sex, was
calculated using the same approach as that
developed by Pollard. This is summarised in
the appendix and described in detail
elsewhere.6

Results

The contributions of each of the groups of
cause of death in each age band to the change
in overall life expectancy at birth between the
selected years are shown in tables 2-5. Taking
males first, during the 1970s decreasing deaths
in every age group contributed positively
towards the increase in overall life expectancy,
but not equally—the improvement in mortality
was most prominent among infants and the
elderly. Although there were also improve-
ments between the ages of 1 and 59, these
were somewhat smaller with few age groups contrib-
uting more than a tenth of a year. When exam-
Figure 1  Life expectancy at birth in Spain, 1970-93. Source: WHO Health for All Database

Table 1  Disease categories used in study

<table>
<thead>
<tr>
<th>Disease category</th>
<th>Abbreviated ICD-9 codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious diseases</td>
<td>001-139</td>
</tr>
<tr>
<td>Respiratory cancer</td>
<td>161-162</td>
</tr>
<tr>
<td>Other cancer</td>
<td>140-157, 170-239</td>
</tr>
<tr>
<td>Cerebrovascular diseases</td>
<td>430-438</td>
</tr>
<tr>
<td>Cardiovascular diseases</td>
<td>390-429, 440-459</td>
</tr>
<tr>
<td>Respiratory diseases</td>
<td>460-519</td>
</tr>
<tr>
<td>Accidents</td>
<td>E800-E949, E960-E999</td>
</tr>
<tr>
<td>Congenital/ perinatal diseases</td>
<td>740-799</td>
</tr>
<tr>
<td>Suicide</td>
<td>E950-E959</td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>571</td>
</tr>
<tr>
<td>Other diseases</td>
<td>240-389, 520-570, 572-739, 780-799</td>
</tr>
</tbody>
</table>

Table 2  Contribution to change in male life expectancy at birth in Spain, 1972-82 (values, years)

| Age group | Infectious Respiratory Other Cancer Cerebrovascular Other Cardiovascular Respiratory Other Respiratory Accidents & Violence Congenital and perinatal Suicide Cirrhosis Other Total |
|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 0         | 0.155          | 0.000          | 0.004          | 0.021          | 0.030          | 0.240          | -0.004         | -0.123         | 0.000          | -0.001         | 0.156          | 0.478          |
| 1-4       | 0.030          | 0.000          | 0.003          | 0.008          | 0.018          | 0.051          | 0.030          | -0.005         | -0.001         | 0.001          | 0.266          | 0.194          |
| 15-34     | 0.013          | -0.004         | -0.005         | -0.002         | 0.017          | 0.008          | 0.095          | 0.003          | -0.022         | -0.001         | 0.079          | 0.190          |
| 35-64     | 0.127          | -0.133         | -0.008         | 0.072          | 0.102          | 0.129          | 0.117          | 0.003          | 0.006          | -0.005         | 0.253          | 0.661          |
| 65+       | 0.038          | -0.101         | 0.025          | 0.254          | 0.281          | 0.197          | 0.017          | 0.000          | 0.006          | 0.022          | 0.230          | 0.969          |
| All       | 0.362          | -0.238         | 0.028          | 0.353          | 0.448          | 0.624          | 0.254          | -0.122         | -0.011         | 0.017          | 0.777          | 2.493          |

Table 3  Contribution to change in male life expectancy at birth in Spain, 1982-92 (values, years)

| Age group | Infectious Respiratory Other Cancer Cerebrovascular Other Cardiovascular Respiratory Other Respiratory Accidents & Violence Congenital and perinatal Suicide Cirrhosis Other Total |
|-----------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 0         | 0.022          | 0.000          | 0.000          | 0.011          | 0.015          | 0.037          | 0.007          | 0.185          | 0.000          | 0.001          | -0.011         | 0.266          |
| 1-4       | 0.022          | 0.000          | 0.027          | 0.001          | 0.008          | 0.013          | 0.036          | 0.004          | 0.001          | 0.001          | 0.004          | 0.110          |
| 15-34     | -0.006         | 0.002          | 0.017          | 0.011          | -0.024         | -0.019         | -0.244         | -0.005         | -0.030         | -0.002         | -0.266         | -0.566         |
| 35-64     | 0.010          | -0.106         | -0.112         | 0.108          | 0.218          | 0.195          | -0.009         | -0.004         | -0.018         | 0.003          | -0.050         | 0.190          |
| 65+       | -0.001         | -0.098         | -0.127         | 0.279          | 0.336          | 0.014          | 0.014          | -0.001         | -0.010         | 0.026          | 0.017          | 0.450          |
| All       | 0.048          | -0.203         | -0.195         | 0.411          | 0.354          | 0.100          | -0.192         | 0.179          | -0.057         | 0.120          | -0.314         | 0.450          |

KEY POINTS
- The improvements in life expectancy in Spain during the 1970s were not maintained in the 1980s.
- This is largely due to a combination of long term increasing trends in diseases such as lung cancer in men and more recent increases in deaths of young men, many of which are the result of accidents and, probably, AIDS.

from deaths among young adults (table 3). Two categories of cause of death are responsible for this poor performance—accidents and violent deaths and the “other” category. The latter is a loose grouping of causes of death not classified elsewhere, but careful examination of the data shows that the main contributor to the increase in this category is the B18 category (ICD-9 tabular list), “endocrine and metabolic diseases, immunity disorders”, a category that commonly contains many deaths from AIDS. That AIDS might explain this rise is supported by the related observation that infectious diseases also make a negative contribution in the age groups 25-44 and by the fact that Spain now has the highest AIDS incidence rate in Europe.

At older ages there have been further improvements, despite the negative contribution of cancers, especially of the respiratory system, which continue to contribute a decrease of about 0.2 of a year to overall life expectancy. Overall, 0.7 years of life expectancy at birth can be accounted for by decreasing deaths above the age of 50, mainly due to cardiovascular disease. However, this substantial achievement is totally annulled by the corresponding loss of 0.7 years from increasing deaths between the age of 15 and 49. Consequently it can be considered that the remaining improvement in life expectancy has been achieved through falling deaths in infancy and childhood.

For females, the period between 1972 and 1982 was characterised by substantial improvements on all fronts. Nearly half a year of life expectancy was gained in Spain during the 1970s and 1980s.
expectancy was gained by reduced mortality among infants, while the older ages experienced large gains through reduced mortality from cardiovascular diseases and some malignant neoplasms (Table 4). During the period 1982-92 there was overall virtually no improvement between the ages of 1 and 49. However, there were further improvements for infants and elderly (Table 5). Overall, there was a substantial improvement in deaths from accidents and cirrhosis, the former in marked contrast to the situation for men. The “other” category once again contributed negatively in the age groups 20-39, again possibly due to increasing deaths from AIDS. The positive contribution in the 1970s from falling deaths from cancer was eliminated.

**Discussion**

Throughout the period 1972-92, life expectancy increased in Spain for both sexes. However, there was a marked slowing down during the second decade, especially for men. Although this situation has been noted by some Spanish authors, it has received relatively little attention in international journals.

Among both men and women, decreases in cardiovascular mortality at older ages made large contributions to the increase in life expectancy. In contrast, accidents and violence among young adults made major negative contributions. There were also substantial increases in “diseases of the endocrine and immune systems”, a category which often contains AIDS deaths.

Although there is no reason to doubt the overall data on life expectancy, it is possible that the analysis offered here could be subject to artefact due to changes in coding practice and in particular to the change from the 8th to the 9th International Classification of Disease. The use of these broad diagnostic categories should ensure that this has little effect, except possibly the observed negative contribution from congenital and perinatal deaths.

The trends in life expectancy between 1972 and 1992 can be considered as having two components. The first are those long term trends that have persisted through the entire period with little overall change, such as the persistent negative consequences of respiratory cancers in men and positive contributions from cerebrovascular and cardiovascular diseases. The first of these emphases the importance of policies to address tobacco consumption in Spain. Although the level of respiratory cancer among women is low, something that has been noted elsewhere, it has been shown in a case-control study that this is consistent with their smoking history. Unfortunately, this situation seems unlikely to persist as there has been a considerable increase in the proportion of female smokers since the 1970s, from 18-26%. The other changes suggest that concerns about the impact of moves away from a traditional Mediterranean diet may so far be premature, although we cannot exclude the possibility that any effects may emerge in the future. The reasons for these falls remain poorly understood and require further research.

Reductions in deaths from other respiratory diseases made an important contribution to improving life expectancy in the first period, but had very little effect in the second period. This is a pattern seen in many other countries and reflects the long term reduction in mortality from many infectious diseases.

The second component comprises those conditions for which trends have changed during this period. For men, who have experienced the greater overall slowing of the rate of increase of life expectancy, the largest contributors have been deaths from accidents and from “other” causes. These have affected young adults of both sexes though disproportionately so young men.

The ICD-9 classification does not contain specific codes for AIDS related deaths. However, as well as the increase in deaths from “diseases of the endocrine and immune systems”, there has also been an increase in mortality from infectious diseases at younger age group that is consistent with the idea that the spread of HIV/AIDS is responsible for the increase in the “other” category. In 1992,
Life expectancy

study plus involved been reported having drunk in the licences, in of was compared with other contribution 14 incidence Europe, a narcotic related signs in given 1992 of over 43000 AIDS cases had been reported 11 out of a population of 39 million. Moreover, the epidemic does not show any signs of abating, with forecasts predicting between 7000 and 9000 new cases per year. In Spain, as in the other southern countries of Europe, in most of the reported cases (66%) transmission was through injecting drug use. Recent estimates put the number of HIV positive people at 150 000 at the end of 1993, with an increase amongst the heterosexual population.

The public health importance of accidents, and especially road traffic accidents, has been the subject of much research in Spain. The 1993 national health survey reported that 7.8% of the population had had a road traffic accident in the preceding year, and the frequency was highest among males aged 11-30.10 One study has noted the much greater contribution of motorcycle accidents in Spain compared with other European countries.11 Other studies have highlighted the importance of alcohol in road traffic accidents. One survey of those on the national register of those with driving licences, albeit with a very low response rate, reported that 14.3% had driven while drunk in the preceding year.17 The same survey also reported a high frequency of use of illicit drugs, with 3% of respondents reporting having driven after taking them.18 Regular drug users were significantly more likely to have been involved in an accident. The importance of alcohol has also been noted in a study which reported a steady increase throughout the 1980s in alcohol related deaths.11

Deaths from suicide require comment as a recent study noted that while Spanish men and women had the second lowest rates of suicide in western Europe (defined as the 15 EU countries plus Iceland, Norway and Switzerland), this is no longer the case due to a sharp increase in suicide rates: 60% for women and 50% for men over the period 1981-91.3 Our analysis provides more insight into this phenomenon. While suicide rates have been increasing, they still have no significant impact on overall life expectancy. However, the age distribution of the increase is important, particularly for men. While the increase concerned mostly young men between 1972 and 1982, this has now spread to all ages and especially the elderly. While the study of suicide deaths is fraught with possible reporting biases, suicide remains a strong indicator of a lack of psychosocial well being which is increasingly being recognized as an important determinant of overall health.20

This study goes some way to understanding the nature of the failure to maintain the improvements in life expectancy seen in Spain during the 1970s and identifies the priority areas for public health policies. Inevitably, it raises more questions than it answers and highlights several areas requiring further study. In particular, by concentrating on medically defined causes of death it does not address possible underlying factors such as changes in social cohesion, income inequalities and related factors. It is planned to address these issues by taking advantage of the marked regional variations which, although not reported here, are known to exist.21

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Conflicts of interest: none.

6 del Valle-Gomez MO, Lopez-Gonzalez ML, Arco-Gonzalez PI, Cueto-Espinar A. Analisis de los anos poten
Appendix

METHOD OF COMPARING THE CONTRIBUTION OF DEATHS IN AGE GROUPS AND FROM SPECIFIC CAUSES TO DIFFERENCES IN LIFE EXPECTANCY IN TWO POPULATIONS

Designating life expectancy at birth for populations 1 and 2 as \( e_{10} \) and \( e_{20} \), the difference between the two life expectancies can be written:

\[
e_{10} - e_{20} = \sum \left( m^0_i - m^0_j \right) w_i, \quad w_i = \frac{1}{2} \left( p^x_i + p^x_j \right)
\]

where \( m_i(1) \) is the central mortality rate for cause \( I \) between age \( x \) and \( x+n \).

The weight \( w_i \) is given by the formulae:

\[
e_{10} - e_{20} = \sum \sum \left( Q^0_i - Q^0_j \right) w_i
\]

with:

\[
Q_i = l_x \left( \frac{l_{ax}}{l_{bx}} \right)
\]

where \( l_x \) is the life table number of people alive at age exact \( x \).

The quantities \( \left( Q^0_i - Q^0_j \right) w_i \) give the weight of each cause in the difference observed between the two life expectancies.

The sum over all ages gives the total contribution for each cause \( I \) in that difference while the sum over causes would give the relative weight of mortality at each age \( x \).