How long do Argentines live and how we die?

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Structure of the presentation

1. Mortality trends
2. Age and sex differentials
3. Causes of death
4. Regional differentials and socioeconomic determinants
5. Some international comparisons
6. Perspectives and final comments
Mortality transition in Argentina

Crude death rates
Argentina, 1870-2010
Long term trends in $e_0$

Life expectancy at birth (both sexes)
Argentina, 1869-2015

$e_0(t) = 0.336 \ t - 596.9$
$R^2 = 0.97$

$e_0(t) = 20 + 65 / (1+e^{-0.0243 \ t - 47.0625})$
Mortality by age: Trends in Argentina

Probability of dying within 5 years from exact age $x$
Argentina, both sexes, 1869-2015
Evolution from “U” to “J”

Probability of dying within 5 years from exact age $x$
Argentina, both sexes, 1869-2015
Rectangularization of the survivorship curve

Survivors at exact age \( x \) \([l(x)]\)
Argentina, both sexes, 1869-2015
Mortality differentials by sex

Life expectancy at birth by sex
Argentina, 1869-2015
Differentials by age and sex

Mortality rates by age and sex
Argentina, 2010-2015

Source: own elaboration based on ECLAC (2010).
(Not much) knowledge on trends and causes of death in Argentina

Proportion of deaths due to infectious and parasitic diseases. Argentina, 1911-1960

Source: Grushka (2010).
Distribution of death by causes and age groups  Argentina 2010

Note that total distribution is (highly) affected by population’s age (and sex) structure.

Source: own elaboration, based on MSAL (2012).
Mortality rates by causes and age groups. Argentina, 2010

Source: own elaboration, based on MSAL (2012).
Mortality by cause and the need for age standardization

Crude death rates by groups of causes
Argentina, years 1960 and 2007

Note that CDR is (highly) affected by population’s age and sex structure. Apparently, mortality stagnates but aging should be taken into account!
## Age standardized mortality by cause  Argentina, 1960-2007

<table>
<thead>
<tr>
<th>Group of causes</th>
<th>ASMR per 100,000</th>
<th>Relative variation</th>
<th>Distribution (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infectious diseases</td>
<td>92</td>
<td>24</td>
<td>-74,2%</td>
</tr>
<tr>
<td>Cancer</td>
<td>176</td>
<td>100</td>
<td>-43,0%</td>
</tr>
<tr>
<td>Cardiovascular diseases</td>
<td>218</td>
<td>128</td>
<td>-41,4%</td>
</tr>
<tr>
<td>Violent / external deaths</td>
<td>68</td>
<td>44</td>
<td>-35,5%</td>
</tr>
<tr>
<td>Rest of causes</td>
<td>306</td>
<td>194</td>
<td>-36,5%</td>
</tr>
<tr>
<td>Total</td>
<td>860</td>
<td>490</td>
<td>-43,0%</td>
</tr>
</tbody>
</table>

Note: rates for 2007 were standardized based on 1960 age structure (INDEC, 2005a).

Cardiovascular diseases is the most significant cause (explains 25% of the reduction in the period), as in EU, Japan or USA (Ridsdale and Gallop, 2010)
Regional differentials in $e_0$

Life expectancy at birth (both sexes) by province and period
Argentina 1980-2001

Source: own elaboration based on Grushka (2010).
Socioeconomic influences on mortality levels

Life expectancy at birth and Gross Domestic Product per capita, by province. Argentina, year 2001

\[ y = 1.873 \ln(x) + 57.13 \]
\[ R^2 = 0.505 \]

Source: own elaboration based on Grushka (2010).
Trends of aggregate differentials

Life expectancy at birth and structural poverty (UBN), by province. Argentina, 1980-2001

Source: own elaboration based on Grushka (2010).

\[ y = -0.162x + 76.57 \]
\[ R^2 = 0.717 \]

\[ y = -0.119x + 73.7 \]
\[ R^2 = 0.742 \]

\[ y = -0.155x + 72.78 \]
\[ R^2 = 0.706 \]
The international experience:
Significant differences in $e_0$, 1950-2000

Source: Schnabel and Eiler (2009).
The relationship between national income levels and $e_0$

- Strong and positive in the poorest countries, but not linear: levels in richer countries are less sensitive to changes in income.

- Changing over time: $e_0$ has increased at all levels of income.

- Controversy about the underlying mechanisms (living standards, public health initiatives, medical practices, personal care), their relative importance and policy implications.

Source: own elaboration based on Preston (1975 and 2007).
Differentials in $e_0$ by GDP

“The Preston’s curve”

**FIGURE 1** The changing relationship between income and life expectancy: 1960, 1990, and 2000

1960: $\text{life} = -37.9 + 11.7 \times \ln(\text{income})$

1990: $\text{life} = -13.239 + 9.2 \times \ln(\text{income})$

2000: $\text{life} = -17.3 + 9.6 \times \ln(\text{income})$

Source: Soares (2007).
Reasons for reaching lower mortality with similar economic levels

- "Wealth" effect: improvements in quality of life due to accumulated assets
- Qualitative factor: as time passes by, the same "real" income can "buy" better health
- "Psycho-social" liberalization: more permissive attitudes, development of welfare states, growth of democracy and equality before the law
- Biological adaptation: elimination of the most vulnerable sectors of the population

Life insurance practice: 
Comparison of life expectancies 
at different ages by sex

Life Tables: GAM-71, Argentina 1990/92, 2000/01 and 2010/15

<table>
<thead>
<tr>
<th>Life Table</th>
<th>Males</th>
<th></th>
<th>Females</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>e(15)</td>
<td>e(65)</td>
<td></td>
<td>e(15)</td>
<td>e(60)</td>
<td>e(65)</td>
</tr>
<tr>
<td>GAM 1971</td>
<td>60.1</td>
<td>15.1</td>
<td>66.5</td>
<td>23.5</td>
<td>19.2</td>
<td></td>
</tr>
<tr>
<td>1990-1992</td>
<td>55.9</td>
<td>13.5</td>
<td>62.8</td>
<td>21.3</td>
<td>17.3</td>
<td></td>
</tr>
<tr>
<td>2000-2001</td>
<td>56.8</td>
<td>14.0</td>
<td>64.1</td>
<td>22.4</td>
<td>18.4</td>
<td></td>
</tr>
<tr>
<td>2010-2015</td>
<td>58.8</td>
<td>15.2</td>
<td>66.1</td>
<td>23.8</td>
<td>19.7</td>
<td></td>
</tr>
</tbody>
</table>

Note: GAM-71 was the static life table applied (regulated) for estimating costs, selling, and reserving annuities by the individual capitalization regime (1994-2008).

Source: own elaboration based on Belliard and Grushka (2009) and ECLAC (2010).
Trends and perspectives: Will $e_0$ increase forever or there is a biological limit?

Potential factors for the future development of mortality

- Positive:
  - reduction in levels of deprivation and housing improvements
  - public support to improve health, income and expenditure on medical advances
  - decline in the prevalence of smoking population

- Negative:
  - obesity
  - the emergence of new diseases (HIV, SARS)
  - resurgence of old diseases (f.i., tuberculosis)

- Unclear:
  - modern lifestyles

Source: Gallop (2007).
Final comments

- After reviewing the diversity of approaches, assumptions and different findings, it is really complex to speculate about longevity prospects in Argentina.

- More detailed knowledge of the past pathways is a key element, to which this paper tries to contribute.

- Challenges are open… but more and better research should be our commitment!
Thank you!

Questions and comments:

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