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# Micro-analysis of mortality in urban areas The parish of Oliveira in Guimarães between the 18th and 20th century

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**Abstract**

*For the central parish of the city of Guimarães, Oliveira, from the late 16th century to the early 20th century, and by using the methodology of parish reconstitution (Amorim, 1991), we have a demographical/genealogical database organized from nominative data of baptism, marriage an burial registers, with information about social status obtained both from testaments and parish classification. We also have hospital registers for the city of Guimarães during that time and status animarum for the parish of Oliveira from 1734 onwards.*

*The systematic crossing of this whole information allows us to position each adult individual in terms of family and social life, as well as to follow his or her life course within a given adult community, in a long-term period. The mortality register of individuals under the age of seven is not systematic before 1860, according to the dispositions of the Diocese of Braga to which Guimarães belongs.*

*By extending the research up to 1910, we aim to systematically follow the adult population born between the late 18th century and the early 19th century while at risk of dying, relating it to the social environment in which its existence occurs. We also aim to evaluate infant-juvenile mortality from 1860 onwards, according to the birth social status.*

The ultimate goal for demographic historians, even for those who chose the classical micro-analytical approach, is necessarily to explain the evolution of populations in light of the inter-influence of demographic variables. This is tough work, especially in urban settings, often pursued in stages, but amply justified by the temporal horizon that can be opened to knowledge.

In Historical Demography, the methodological choices become crucial, due to the profile of the sources, which become more diversified in the long term, and to the specific complexity of variables such as Mobility and Mortality.

Thus, the stage we are now pursuing - the analysis of mortality in the central parish of Guimarães[i], the parish of Oliveira, between the 18th and 20th centuries - will be accompanied with case-by-case explanations of the methods used and a brief characterisation of the sources.

In our *work plan*, in this *introduction*, after a brief presentation of the space in question, we will explore the view of death in the city and how it was observed and explained by health professionals who lived in the transition between the 19th and 20th centuries.

In the *development* section, limited by the characteristics of the sources, we will address three types of approach to the phenomenon of Mortality, from the 18th to the 20th centuries, comparing the results, in the same chronology, with those extracted from the databases on the Azores Islands of Pico and Faial[ii]:

a) Life expectancy at the age of 30 for individuals born between 1750 and 1829, whose death was recorded.
b) Life expectancy at birth for individuals born between 1835 and 1864 in stable families[iii].
c) Life expectancy at birth for individuals born between 1881 and 1899.

The year 1884 will serve as a starting point of analysis, for the parish of Oliveira, four rural parishes of the Island of Pico, and two urban parishes on the Island of Faial, for which we have relevant documentation, in order to detect any differences, in particular with regard to survival at older ages.

## Development

### 1. Sources

a) Parish records

When building the demographic-genealogical database for Oliveira on which our research is based, the basic sources used were the parish records for baptisms, marriages and deaths. Baptisms were considered for the period from 1590 to 1900, whilst marriage records were extended to include the first five decades of the 20th century, and the death entries only ended in 1990.

The series are continuous, except for the disappearance of a marriage register book for the period 1728 to 1766, which does not raise significant obstacles to our work. Nevertheless, we did face the problem of a certain lack of or even the total absence of mortality records for children under 7, individuals to whom the Church had no obligation to provide comfort at the time of death. This situation is common to the large Archdiocese of Braga, and was generally overcome before the end of the 1850s, when civil legislation standardised procedures concerning the registering of all acts in the parishes. Despite the legal requirements, the survey of the source reveals that only from 1881 were all deaths systematically and continuously recorded in Oliveira.

b) The *róis de confessados (confessional rolls)*

Other sources used were the *róis de confessados* (records of parishioners who confessed and took communion at Easter). The purpose of these documents was to monitor the religious Easter precepts, but they evolved throughout the 19th century to mechanisms of population censuses. They began to record all residents (and not only those aged over 7 as was the case formerly) by their name and age, grouped into households and houses, distributed along the streets and places in each parish. In relation to the head of the family, they contain information on the familial, professional or companionship relationships in each home. The same dwelling could include several family members of different generations or other individuals identified as “assistants” or “tenants”, which, in the latter case, means the payment of a rent for the use of part of the property.

In the parish of Oliveira, we found *róis de confessados* from 1734 to 1944, but only from 1835 on did they tend to include all residents[iv].

These documents are difficult to process as each roll is the basis for drawing up the next roll, interspersed with new households and new individuals in each one of them, or households that have been totally crossed out because their members have left, or single members have been crossed out because they have left or died. The roll may or may not include an explanation as to why someone is absent or dead. All this information, both initial and that added later, is obviously important for our purposes, but when considering the resident population in a specific year, we will have to count only those that were registered in the first moment. This difference is detectable by the placement of the data on the sheet, ink colour and handwriting.

## 2. Demographic-genealogical databases

Our work is based on the organisation of parish information on baptisms, marriages and deaths, through a methodology called *reconstruction of parishes* (Amorim, 1991) using a computer application developed by Fernanda Faria (Faria and Henriques, 2004), called SRP (acronym for *Sistema de Reconstituição de Paróquias*, i.e., Parish Reconstruction System) (Henriques, 2007).

We followed the life path of all individuals who were registered in the parish in defined timeframes, in a genealogical sequence and according to matrimonial links, with open entries to references on their socio-professional and residence situations. Intersections between urban parishes and their urban locations, aiming towards a *central database* (Henriques, 2001), open solid prospects for demographic and social analysis.

Although a few dozen parishes have been reconstructed by a considerable number of authors in Portugal, for obvious reasons, there are few cases that draw on this methodology with regard to urban parishes in the long term, up until the 19$^{th}$ century. We have already done that work for Oliveira, and, in part, for two parishes in the town of Horta, on the Azores island of Faial. In an ongoing project, we expect to have, in the near future, all 10 parish databases gathered into a single one applicable to the urban centre of Guimarães and surrounding parishes, as well as the urban centre of Horta with its rural surroundings, covering 17 parishes on the island of Pico and 13 parishes on the island of Faial.

In the case of Guimarães, only the inter-parish intersections for the period before 1820 have been developed. Consequently, all we have is the analysis of the parish on which, in terms of time span, we conducted more extensive research: the parish of Oliveira.

## 3. Guimarães between the 19th and 20th centuries

The town of Guimarães was, at the time, formed by three parishes: Oliveira do Castelo, S. Paio and S. Sebastião. Some of its streets expanded beyond these limits, extending to the neighbouring parishes of Azurém, Creixomil and Urgeses. Drawing on data from the first census carried out in Portugal, we present a table below showing the evolution of the town's population and its peripheral parishes between 1864 and 1900.

**Table 1**

**Population of the town of Guimarães**

**(1864-1900)**

| | **1864** | **1878** | **1890** | **1900** |
|---|---|---|---|---|
| Oliveira[v] | 3400 | 3626 | 3718 | 4006 |
| S. Paio | 1935 | 1956 | 2278 | 2467 |
| S. Sebastião | 2415 | 2535 | 2615 | 2631 |
| **Total** | **9614** | **9995** | **10501** | **11004** |
| Urgeses | 648 | 752 | 812 | 940 |
| Azurém | 1029 | 1074 | 1107 | 1262 |
| Creixomil | 1579 | 1829 | 1963 | 2223 |
| **Total** | **12870** | **13650** | **14383** | **15429** |
| | | | | |
| **Council** | **45015** | **45744** | **49695** | **54723** |

**Source:** Population Census of the Kingdom of Portugal (1864, 1878, 1890, 1900)

In 1853, Queen Maria II promoted Guimarães to the rank of city, justifying this decision for historical reasons and, at the same time, its great development: "*uma das mais populosas da província do Minho, e a mais florescente em diversos ramos de industria, à qual são devidas a sua opulência e prosperidade, e as suas relações dentro e fora do país (…)*". [*one of the most populated provinces of Minho, and the most flourishing in various branches of industry, to which it owes its opulence and prosperity, and its relations within and beyond the country*]" (Braga, 1953).

The dynamism of the town became even more pronounced during the second half of the 19th century, culminating in 1884 with the inauguration of the rail link to Porto and the 1st Industrial Exhibition of Guimarães. This large showcase of the council's productive capacity boasted the main products of the region, in particular textiles (linen, cotton), leather products, cutlery and jewellery, which were exported all over the country and abroad, especially to Brazil.

At the same time, a series of urban studies and initiatives were launched, clearly showing a major concern for health and sanitary conditions. We highlight the works carried out by the City Improvement Commission, chaired by Avelino da Silva Guimarães, where he proposes: "(…) *to build public washing facilities in Campo da Feira, near the creek; for the public slaughter house, select a plot of land on the upper side of Rua de Sta. Luzia, as clean water is available there; build latrines and public dumps; build bathrooms; forbid enclosed manure deposits; for every new street opened or improved, provide pipelines in proper sanitary and cleanliness conditions; (…) the gas lighting system; (…) remove firework workshops to a location far from the town; find the best way to improve the conditions of our tanneries located in the S. Francisco neighbourhood, not allowing the water running from the tannery sumps to contaminate the Caldeiroa creek, and the tanners' workshops (...) must be moved to outside the city; the prompt and immediate completion of the new market in the extinct S. Domingos Convent; (…)."* (Fernandes,2005:224).

The mere listing of these proposals is sufficient to assess the health problems that the new city faced, especially in a period during which it established itself demographically as one of the first cities in the country.

In a dissertation submitted to the Medical-Surgical School of Porto, João de Meira carried out a comprehensive study on the demography and nosography of Guimarães in the early 20$^{th}$ century, a key testimony for the study of its population. Analysing the age-specific mortality rate between 1896 and 1905, he commented that its maximum value was found in the 0 to 4 age group (223 ‰ for male mortality and 199 ‰ for female mortality), although he believed that these rates were not very high compared with the values obtained for the city of Porto in the same period (respectively 307.2 ‰ and 219.4 ‰). He further noted that, in 1904, 74 people who were strangers to the city had died in the hospital.

Then he proceeded with the nosological study of the council for the year 1904, based on the information collected at the Guimarães Hospital. He found that most of the patients admitted to this hospital lived in the town or in the council, and few (less than 10%) were from neighbouring councils. As for marital status, single women were the ones who most sought out the hospital, which can be related to the traditional imbalance in the sex ratio in this region and the high number of female servants.

**Table 2**

**Total mortality rate for the ten-year period 1895-1905**

**and rates per 1:000 deaths**

| IDADES | Varões | Femeas | Total | Taxas por 1:000 obitos | |
|---|---|---|---|---|---|
| | | | | Varões | Femeas |
| 0 a 4 | 2.481 | 2.213 | 4.694 | 223,2 | 199,1 |
| 5 a 9 | 267 | 234 | 501 | 24,0 | 21,0 |
| 10 a 14 | 98 | 88 | 186 | 8,8 | 7,9 |
| 15 a 19 | 120 | 151 | 271 | 10,7 | 13,5 |
| 20 a 24 | 151 | 152 | 303 | 13,5 | 13,6 |
| 25 a 29 | 107 | 135 | 242 | 9,6 | 12,1 |
| 30 a 34 | 95 | 114 | 209 | 8,6 | 10,2 |
| 35 a 39 | 89 | 123 | 212 | 8,0 | 11,0 |
| 40 a 44 | 116 | 130 | 246 | 10,4 | 11,6 |
| 45 a 49 | 124 | 129 | 253 | 11,1 | 11,6 |
| 50 a 54 | 173 | 178 | 351 | 15,5 | 16,0 |
| 55 a 59 | 172 | 208 | 380 | 15,5 | 18,7 |
| 60 a 64 | 269 | 312 | 581 | 24,2 | 28,0 |
| 65 a 69 | 246 | 264 | 510 | 22,1 | 23,7 |
| 70 a 74 | 333 | 418 | 751 | 29,9 | 37,6 |
| 75 a 79 | 247 | 346 | 593 | 22,2 | 31,1 |
| 80 a 84 | 234 | 299 | 533 | 21,0 | 26,9 |
| 85 a 89 | 92 | 98 | 190 | 8,2 | 8,8 |
| 90 a 94 | 32 | 36 | 68 | 2,8 | 3,2 |
| 95 a 99 | 10 | 11 | 21 | 0,8 | 0,9 |
| 100 e mais | 1 | 0 | 1 | 0,08 | 0 |
| Idade desconhecida | 7 | 10 | 17 | 0,6 | 0,8 |
| Total | 5.463 | 5.650 | 11.113 | 491,5 | 508,5 |

**Source:** (Meira, 1907:130)

A very interesting observation compared the gender and age-specific number of patients treated at the hospital. He rightly noted that "*if we take into account that the earlier ages are always more maltreated through neglect by their families and seldom receive hospital care, this higher frequency of patients between the ages of 20 and 30 is in line with the data we presented earlier on the age-specific composition of the population*" (Meira, 1907: 135).

A brief analysis of the survey conducted by João de Meira on the professions of patients treated at the hospital allows us to immediately conclude that it is primarily the disadvantaged population that mostly used these services. The most common occupations for men were day labourers and servants (farming servants mostly). For women, they were mainly housewives, followed by servants and weavers.

## 4. Comparative study of the population of the Oliveira parish in the last quarter of the 19th century

Appling the procedures mentioned with regard to the population survey conducted on the basis of the *róis de confessados*, the year 1884 was selected to compare the state of the population in Oliveira and in other communities for which we have studied the same type of documentation. These are the two urban parishes on the Island of Faial, Matriz and Angústias, and three rural communities on the Island of Pico, S. João, Santo Amaro and the rural setting of the town of Lajes[vi].

Therefore, in 1884 we counted 3157 inhabitants[vii] in the parish of Oliveira; the parishes of Matriz and Angústias in Horta, analysed together, had a population of 5465 inhabitants; in the rural parishes of S. João and Santo Amaro, and in the rural area of Lajes, in an aggregated manner, we counted 5379 people.

By simply comparing the profile of the pyramids (we used proportional values in each case), we note a marked difference between rural and urban populations with regard to distribution of people by age brackets. The age brackets between 20 and 65 are more prevalent in cities, especially with regard to women.

In all parishes, both urban and rural, the sex ratio changed noticeably, indicating stronger differential mobility.

**Figure 1**
**Age pyramid in Oliveira**
**(1884)**

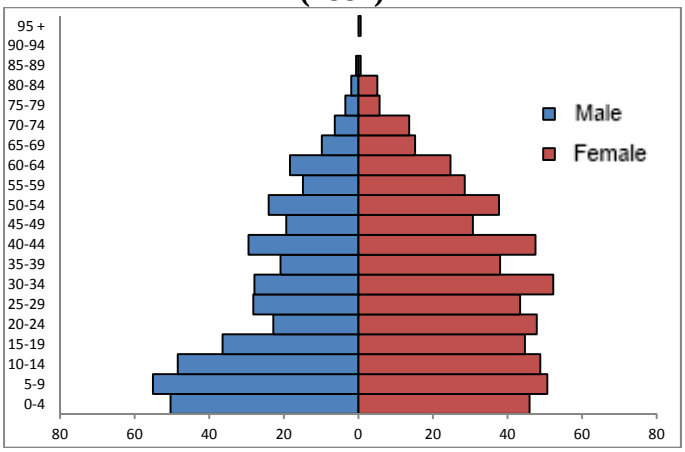


**Figure 2**
**Age Pyramid in Matriz and Angústias**
**(1884)**

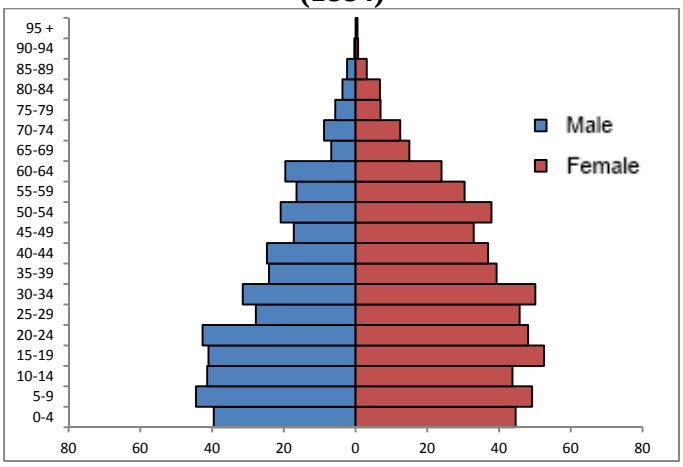
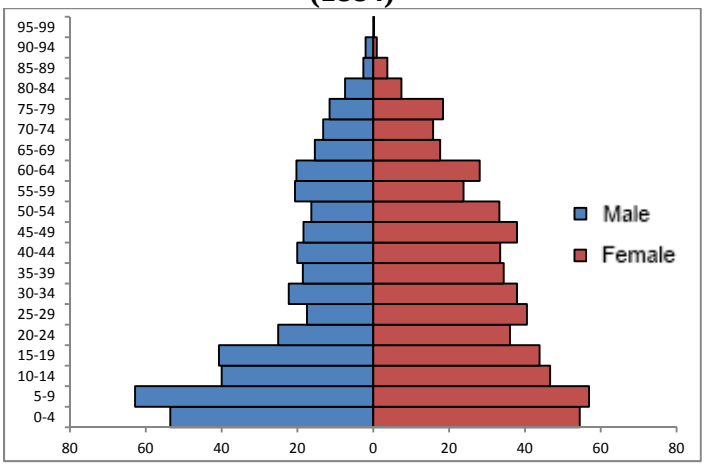



**Figure 3**
**Age Pyramid in S. João, Santo Amaro and the rural area of Lajes**
**(1884)**




The comparison is made easier in the following table, containing the percentage distribution by age and gender, in the parish of Oliveira and in the group of the said Azorean rural and urban communities.

We can see that in Oliveira, minors under 15 years of age have a weight of 36% in males and 25% in females. In the urban communities of Faial, the percentages stand at 30% and 24%, respectively. In the rural communities of Pico, we find 36% boys and 27% girls. At this point, this is not the place to interpret these figures, given the inter-influence of variables, but we can assume that a higher fertility rate in the mainland parish interfered in the result, along with differential behaviours relative to infant and child mortality rates in relation to urban or rural Azores parishes. We cannot, however, neglect the existence of children abandoned in foundling wheels, and later left in the care of nannies in rural areas, not reflected in the respective *róis de confessados*.

**Table 3**
**Population (comparative analysis)**
**Oliveira, urban parishes of Faial and rural areas of Pico**
**(1884)**
**%**

| Age brackets | Oliveira (1880) | | Urban parishes of Faial (1884) | | Rural areas of Pico (1884) | |
|---|---|---|---|---|---|---|
| | M | F | M | F | M | F |
| 0-4 | 12 | 8 | 9 | 8 | 12 | 9 |
| 5-9 | 12 | 9 | 11 | 8 | 15 | 10 |
| 10-14 | 12 | 8 | 10 | 8 | 9 | 8 |
| 15-19 | 9 | 8 | 10 | 9 | 9 | 8 |
| 20-24 | 6 | 8 | 10 | 8 | 6 | 6 |
| 25-29 | 7 | 7 | 7 | 8 | 4 | 7 |
| 30-34 | 7 | 9 | 7 | 9 | 5 | 7 |
| 35-39 | 5 | 6 | 6 | 7 | 4 | 6 |
| 40-44 | 7 | 8 | 6 | 6 | 5 | 6 |
| 45-49 | 5 | 5 | 4 | 6 | 4 | 7 |
| 50-54 | 6 | 6 | 5 | 7 | 4 | 6 |
| 55-59 | 4 | 5 | 4 | 5 | 5 | 4 |
| 60-64 | 4 | 4 | 5 | 4 | 5 | 5 |
| 65-69 | 2 | 3 | 2 | 3 | 4 | 3 |
| 70-74 | 1 | 2 | 2 | 2 | 3 | 3 |
| 75-79 | 1 | 1 | 1 | 1 | 3 | 3 |
| 80-84 | 0 | 1 | 1 | 1 | 2 | 1 |
| 85 e + | 0 | 0 | 0 | 0 | 1 | 1 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** |

For individuals aged 65 years and over, it is obvious that the rural parishes of Pico are at an advantage, where 13% of this age bracket is male and 11%, female. In the urban area of Faial, the percentages stand at 6% and 7%, respectively, whilst in Oliveira the weight of males in that age bracket does not rise above 4%, although it reaches 7% in the case of females.

We started our analysis with the idea that, in the 19$^{th}$ century, life expectancy in the Pico rural communities would have been markedly more favourable in all age brackets, particularly in older ages, compared with the nearest urban area, or with the urban parish in the mainland.

**a) Life expectancy at 30 of individuals born between 1750 and 1829, whose death was recorded**

In the parish of Oliveira, since the continuous, systematic recording of infant mortality only started in 1881, and the *róis de confessados* containing the entire resident population are only available from 1835 onwards, a valid approximation to the mortality patterns in previous periods is only possible, if solely adult individuals at more stable

ages are considered in the analysis. In these circumstances, it is common practice to focus on married individuals over 25 years of age, considering them as the most stable sector of the population. In our case, we chose to only consider 30 as the most stable age, given the relative frequency of mobility among younger couples in urban areas, and the fact that marriage took place at an older age in the Azorean rural parishes under study.

**Table 4**

**Life expectancy at 30 - Generations born between 1750 and 1829**

**Comparison between Oliveira and the island communities**

| Age | Oliveira (Guimarães) | | | Main parish/ Faial | | | Rural parishes/Pico | | |
|---|---|---|---|---|---|---|---|---|---|
| | M | F | MF | M | F | MF | M | F | MF |
| 30 | 27.9 | 28.2 | 28.1 | 30.9 | 33.0 | 32.2 | 40.1 | 40.8 | 40.5 |
| 35 | 25.6 | 26.3 | 26.0 | 28.6 | 30.6 | 29.9 | 36.2 | 36.9 | 36.6 |
| 40 | 22.3 | 26.5 | 24.6 | 25.1 | 27.5 | 26.6 | 32.0 | 33.0 | 32.6 |
| 45 | 19.4 | 23.2 | 21.5 | 22.2 | 24.8 | 23.8 | 28.1 | 29.2 | 28.7 |
| 50 | 16.0 | 20.5 | 18.5 | 18.9 | 22.2 | 20.9 | 24.1 | 25.2 | 24.7 |
| 55 | 14.1 | 16.7 | 15.6 | 15.9 | 19.2 | 17.9 | 20.3 | 21.4 | 20.9 |
| 60 | 12.5 | 14.0 | 13.4 | 12.7 | 15.4 | 14.4 | 16.9 | 17.8 | 17.4 |
| 65 | 8.2 | 11.4 | 10.4 | 9.4 | 12.9 | 11.6 | 13.8 | 14.4 | 14.1 |
| 70 | 7.7 | 8.5 | 8.2 | 6.8 | 10.4 | 9.1 | 10.3 | 11.5 | 11.0 |
| 75 | 5.4 | 6.1 | 5.8 | 5.2 | 8.3 | 7.3 | 8.0 | 8.7 | 8.4 |
| 80 | 4.6 | 5.6 | 5.2 | 4.6 | 6.2 | 5.8 | 5.8 | 6.2 | 6.1 |
| **Obs.** | **138** | **188** | **326** | **207** | **337** | **544** | **3397** | **3841** | **7238** |

Thus, our study took account of all the individuals identified at death by their birth date[viii], aged 30 years or over, in both the parish of Oliveira and the Matriz parish on the Faial island[ix], and in 4 aggregated rural parishes on the Pico island[x]. We calculated the life expectancy between 30 and 80, and present the results in five-year intervals.

Comparing the central parish of Guimarães with the central parish of Horta, on the island of Faial, with regard to life expectancy at 30 for individuals born between 1750 and 1829 identified as such at death, we find that, at this age, life expectancy was more favourable in Horta by about 4 years, with less differences from the age of 40, but always more favourable to the island town, even in older age brackets.

In the case of the 4 rural communities of Pico, life expectancy at the age of 30 outperformed Oliveira by 12 years, and the Matriz parish of Horta by 8 years. In previous works, we had already called attention to Pico's striking survival rate in the 18$^{th}$ and 19$^{th}$ centuries (Amorim, 2004). We admit, then, that the mild climate, its

relative dryness, purity of water and a varied diet, with corn cake as a basic food, as well as potatoes, both the English variety and sweet, little meat, plenty of fish, milk and dairy products, some wine and fruit in abundance, may have influenced this result. Geographical factors, such as isolation, which prevented epidemics, cultural factors, related to prolonged breastfeeding, woman-mother and child protection, and even genetic factors, may also have been influential.

As we have a systematic record of infant mortality for the Pico island parishes, we can calculate, with reasonable accuracy, life expectancy at birth for generations born between 1750 and 1829. The results obtained on the life expectancy from the age of 30 by tracking the life paths can then be compared with the results we presented earlier, covering only those individuals that were born and died in the communities in question.

For two of the Pico parishes (S. João and Santo Amaro), we intersected the demographic-genealogical databases with the *róis de confessados* to find the year in which those who did not die in their parishes no longer appeared on the records. As for Ribeiras and Prainha, without *róis de confessados* and no deaths in the parish, we had to resort to some conventions to mark the end of an observation, on a case-by-case basis. Thus, when a family moved, we considered, in an approximation by default, the date of departure for each member of the household was set at the last known family date, generally at the time of the birth or death of a child. In the case of an isolated departure, the end of the observation was set conventionally at the $20^{th}$ birthday, taking into account the main reasons for the absence. Emigration to Brazil or to the United States, or moving to Horta or Angra, took place in most cases at puberty, while at older ages people left (less frequently) as a result of marriage.

**Table 5**
**Life expectancy in the rural communities of Pico**
**Generations born between 1750 and 1829**
**Observation with the monitoring of life paths and stable individuals**

| Age | Monitoring of life paths | | | Stable individuals | | |
|---|---|---|---|---|---|---|
| | M | F | MF | M | F | MF |
| 0 | 52.9 | 55.8 | 54.3 | | | |
| 5 | 59.4 | 60.7 | 60.1 | | | |
| 10 | 56.2 | 57.4 | 56.8 | | | |
| 15 | 52.7 | 53.4 | 53.1 | | | |
| 20 | 48.6 | 49.4 | 49.1 | | | |
| 25 | 44.6 | 45.3 | 45.0 | | | |
| 30 | 40.7 | 41.3 | 41.0 | 40.1 | 40.8 | 40.5 |
| 35 | 36.6 | 37.3 | 37.0 | 36.2 | 36.9 | 36.6 |
| 40 | 32.4 | 33.3 | 32.9 | 32.0 | 33.0 | 32.6 |
| 45 | 28.4 | 29.4 | 29.0 | 28.1 | 29.2 | 28.7 |
| 50 | 24.3 | 25.4 | 24.9 | 24.1 | 25.2 | 24.7 |
| 55 | 20.5 | 21.6 | 21.1 | 20.3 | 21.4 | 20.9 |
| 60 | 17.0 | 18.0 | 17.5 | 16.9 | 17.8 | 17.4 |
| 65 | 13.8 | 14.5 | 14.2 | 13.8 | 14.4 | 14.1 |
| 70 | 10.4 | 11.6 | 11.1 | 10.3 | 11.5 | 11.0 |
| 75 | 8.0 | 8.8 | 8.4 | 8.0 | 8.7 | 8.4 |
| 80 | 5.8 | 6.3 | 6.1 | 5.8 | 6.2 | 6.1 |

As can be seen on the table above, observations that did not involve the case-by-case monitoring of life paths, deflate in about half a year the results of life expectancy at the age of 30 (which is understandable because, although more limited, there is still mobility of individuals at higher ages). The two curves then gradually draw closer together[xi].

**b) Life expectancy at birth of individuals born between 1835 and 1864 in stable families.**

As we have seen, from 1835 the Oliveira *róis de confessados* refer to all resident individuals, of any age. Since we have systematic records of births, which monitor stable families year after year, it is possible to calculate with reasonable accuracy the date on which children died without there being a death record. Then, we considered that missing entries in the roll for children from stable families after the age of 8 derived from motives related with work or schooling, particularly in the case of future clergymen.

If we subtract half of those missing from the initial number at each age (Henry, 1976:169), we are able to calculate the respective mortality ratios for each year, monitoring the generations until they become extinct.

Life expectancy at birth for generations born in the Horta parishes cannot be considered in this analysis, due to two interruptions in the death records in Angústias in the first half of the 19th century, and also because the database for the Matriz parish has not yet been properly prepared for this complex study[xii].

**Table 6**

**Life expectancy at birth - Generations born between 1835 and 1864**

**Comparison between Oliveira and the rural communities of Pico**

| Age | Oliveira (Guimarães) | | | Rural communities/ Pico | | |
|---|---|---|---|---|---|---|
| | M | F | MF | M | F | MF |
| 0 | 37.5 | 42.0 | 40.0 | 56.4 | 58.6 | 57.6 |
| 5 | 49.5 | 53.3 | 51.9 | 62.2 | 63.9 | 63.2 |
| 10 | 46.8 | 50.9 | 49.3 | 58.4 | 60.3 | 59.5 |
| 15 | 42.4 | 46.4 | 44.9 | 54.5 | 55.9 | 55.4 |
| 20 | 39.6 | 43.1 | 41.7 | 50.1 | 51.8 | 51.1 |
| 25 | 35.1 | 40.3 | 38.2 | 45.9 | 47.7 | 47.0 |
| 30 | 32.3 | 35.8 | 34.5 | 42.1 | 44.1 | 43.3 |
| 35 | 27.9 | 32.1 | 30.5 | 38.2 | 40.3 | 39.5 |
| 40 | 25.6 | 31.0 | 28.9 | 34.2 | 36.1 | 35.3 |
| 45 | 21.8 | 27.4 | 25.2 | 30.1 | 32.1 | 31.3 |
| 50 | 19.1 | 24.0 | 22.1 | 25.8 | 28.1 | 27.1 |
| 55 | 16.6 | 20.0 | 18.8 | 21.5 | 24.1 | 23.0 |
| 60 | 14.1 | 15.5 | 15.0 | 17.4 | 20.1 | 19.0 |
| 65 | 9.9 | 14.2 | 12.6 | 13.6 | 16.4 | 15.2 |
| 70 | 7.3 | 13.1 | 10.9 | 10.7 | 12.9 | 12.0 |
| 75 | 6.2 | 9.9 | 8.8 | 8.2 | 10.1 | 9.4 |
| 80 | 3.8 | 6.0 | 5.5 | 6.3 | 7.4 | 7.0 |
| 85 | 2.5 | 3.1 | 3.0 | 4.2 | 5.4 | 5.0 |

Life expectancy at birth in Oliveira, for the generations born in stable families between 1835 and 1864, would have been around 40 years of age, whilst in the rural communities of Pico it was over 57. Gender differences, favouring females, are much sharper in Oliveira than in Pico.

According to Massimo Livi Bacci, in the comparisons made between Italy and Europe, and considering the periods between 1750 and 1900, (L. del Panta, M. Livi Bacci, G. Pinto; E. Sonnino, *La Populazione Italiana dal Medioevo a Oggi*, Editori Laterza, 1996, p. 252), we find that the Oliveira rates connote, for the same periods,

with countries in which the mortality rate is more favourable. However, we have to bear in mind that we are analysing only the stable families in Oliveira, excluding from the study children born out of wedlock, and especially, the abandoned children who were particularly vulnerable to an early death. If it were possible to include these risk groups in the analysis, life expectancy would certainly be lower.

Pico is a very special case which seems to show that prophylactic measures against disease, purity of air and water, a healthy diet, physical exercise and emotional balance, and the protection of mother and child, can do for survival what is only possible in societies that have advanced medical care.

The methodical Governor of the Autonomous District of Horta, António José Vieira Santa Rita, in his 1861 Report, estimated that, for the 4 islands of his district (Pico, Faial, Flores and Corvo), there was one death in 55 inhabitants in 1859, the same proportion as in 1858. In the case of Pico, the proportion was one death in 67 residents, which means that, in the mid-19$^{th}$ century, the gross mortality rate was below 15 deaths per thousand inhabitants. He himself insists on the difference in the behaviour of Pico compared to other islands, although, in a population of 27.360 people, there was not *um único facultativo* [*a single doctor*].

**Table 7**

**Life expectancy in some western countries, 1750-1900**

| Countries | 1750-1759 | 1800-1809 | 1850-1859 | 1880 | 1900 |
|---|---|---|---|---|---|
| **England** | 36.9 | 37.3 | 40 | 43.3 | 48.2 |
| **France** | 27.9 | 33.9 | 39.8 | 42.1 | 47.4 |
| **Sweden** | 37.3 | 36.5 | 43.3 | 48.5 | 54 |
| **Germany** | - | - | | 37.9 | 44.4 |
| **Italy** | - | - | | 35.4 | 42.8 |
| **The Netherlands** | - | 32.2 | 36.8 | 41.7 | 49.9 |
| **The Soviet Union** | - | - | | 27.7 | 32.4 |
| **The United States (white population)** | - | - | 41.7 | 47.2 | 50.8 |
| **Australia** | - | - | | 49 | 55 |
| **Japan** | - | - | | 35.1 | 37.7 |

**Source:** (Livi-Bacci, 1987:252)

If we now compare survivors per thousand births for one year, five years and then five-year periods up to 35, between Oliveria, Angústias and the Pico communities, we note greater similarity in urban zones than in the rural ones.

**Table 8**

**Survivors at 35 years of age**
**Comparison between Oliveira, Angústias the Pico communities**
**Generations born between 1835 and 1864**

| Age | Oliveira | | | Angústias(a) | | | Comunidades do Pico | | |
|---|---|---|---|---|---|---|---|---|---|
| | M | F | MF | M | F | MF | M | F | MF |
| 1 | 811.8 | 849.7 | 830.4 | 816.6 | 853.5 | 834.3 | 881.4 | 898.1 | 889.7 |
| 5 | 678.4 | 713.2 | 695.5 | 733.6 | 764.8 | 748.6 | 836.3 | 848.0 | 842.0 |
| 10 | 648.3 | 679.1 | 663.5 | 721.2 | 739.3 | 729.9 | 820.2 | 829.8 | 824.9 |
| 15 | 639.3 | 672.2 | 655.5 | 715.0 | 728.5 | 721.5 | 804.0 | 820.3 | 812.2 |
| 20 | 605.8 | 647.7 | 627.3 | 710.0 | 716.4 | 713.1 | 795.7 | 807.6 | 801.5 |
| 25 | 597.2 | 613.9 | 604.3 | 699.8 | 708.1 | 703.8 | 781.2 | 792.0 | 786.5 |
| 30 | 560.0 | 605.8 | 583.9 | 690.7 | 702.5 | 696.3 | 760.5 | 769.3 | 764.6 |
| 35 | 547.9 | 583.2 | 565.9 | 685.4 | 698.1 | 691.5 | 740.0 | 746.3 | 742.7 |

(a) Generations born between 1834 and 1864

In the analysis of Oliveira, for generations born between 1835 and 1864, the mortality ratios in the first year of life per thousand births was 188.2, 150.3 and 169.6, for males, females and both genders, respectively. In Angústias for generations born between 1834 and 1864 (there is a period missing before 1834), the corresponding results are 183.4, 146.5 and 165.7. in the Pico parishes, they are 118.6, 101.9 and 110.3, respectively.

Despite similarities between Oliveira and Angústias in surviving past the first year of life, at 35 years of age, per thousand births, 566 individuals survived in Oliveira, whilst in Angústias, the number reached 691.

For the generations born in Oliveira between 1881, year in which the deaths of minors started to be recorded more systematically, and 1899, and so as to be able to include all the deceased in our analysis (recall that the collection of death records goes up to 1990), we calculated life expectancy by monitoring the life paths, on a case-by-case basis, following the procedure described in relation to the Pico parishes, without using the *róis de confessados*. For families that moved, we used the last known date for those families. For individuals that left separately, the date of marriage or the 20$^{th}$ birthday mark the end of the observation. It should be noted that the dates of death for the vast majority of individuals born between 1881 and 1899 but who left, are available as from the 1930s, due to entries recorded on their baptism records. We did not consider deaths outside the parish as that would bias the analysis.

**Table 9**
**Life expectancy at birth - Generations born between 1881 and 1899**
**Comparison between Oliveira and the rural communities of Pico**

| Age | Oliveira (Guimarães) | | | Rural communities/Pico | | |
|---|---|---|---|---|---|---|
| | M | F | MF | M | F | MF |
| 0 | 39.0 | 44.7 | 41.7 | 59.2 | 60.4 | 59.8 |
| 5 | 54.0 | 61.6 | 57.7 | 64.5 | 64.5 | 64.5 |
| 10 | 50.7 | 58.8 | 54.6 | 60.3 | 60.1 | 60.2 |
| 15 | 46.3 | 54.1 | 50.1 | 55.9 | 55.5 | 55.7 |
| 20 | 42.0 | 49.4 | 45.6 | 51.9 | 51.6 | 51.7 |
| 25 | 38.0 | 45.3 | 41.5 | 47.3 | 47.9 | 47.6 |
| 30 | 33.9 | 41.9 | 37.7 | 43.4 | 43.7 | 43.5 |
| 35 | 31.7 | 37.7 | 34.7 | 38.8 | 39.5 | 39.1 |
| 40 | 28.8 | 34.0 | 31.5 | 34.3 | 35.8 | 35.1 |
| 45 | 24.6 | 30.0 | 27.4 | 29.9 | 31.9 | 30.9 |
| 50 | 20.6 | 25.9 | 23.4 | 25.4 | 27.3 | 26.4 |
| 55 | 16.4 | 21.9 | 19.2 | 21.3 | 23.1 | 22.2 |
| 60 | 14.1 | 18.3 | 16.4 | 17.3 | 19.0 | 18.2 |
| 65 | 11.2 | 14.2 | 12.9 | 13.7 | 15.2 | 14.5 |
| 70 | 8.2 | 10.3 | 9.5 | 10.5 | 11.9 | 11.2 |
| 75 | 5.5 | 7.3 | 6.7 | 8.7 | 9.5 | 9.1 |
| 80 | 5.1 | 4.9 | 5.0 | 6.0 | 6.9 | 6.5 |
| 85 | 3.6 | 3.8 | 3.7 | 4.3 | 5.1 | 4.8 |

Comparing now survival until 10 years of age, per thousand births, in Oliveira, Angústias and the Pico rural communities (analysis for Angústias only goes until 1911, when the Civil Registry is established in Portugal).

**Table 10**

**Survivors at 10 years of age**
**Comparison between Oliveira, Angústias and the Pico communities**
**Generations born between 1880 and 1899**

| | Oliveira (a) | | | Angústias | | | Pico communities | | |
|---|---|---|---|---|---|---|---|---|---|
| | M | F | MF | M | F | MF | M | F | MF |
| 1 | 799.0 | 828.8 | 813.3 | 806.9 | 816.2 | 811.3 | 886.7 | 904.1 | 895.3 |
| 5 | 653.2 | 664.1 | 658.4 | 718.2 | 763.1 | 739.3 | 849.7 | 867.9 | 858.7 |
| 10 | 632.7 | 641.0 | 636.6 | 707.0 | 752.3 | 728.4 | 839.2 | 859.4 | 849.2 |

(a) Data for Oliveira goes from 1881 to 1889

For the generations born in Oliveira in the last two decades of the 19th century, mortality in the first year of life is more severe when compared to those born between 1835 and 1864, with 201.0 deaths per thousand male births, 171.2 for females, and 186.8 for both genders. This decline is also found in Angústias, although less pronounced, with 193.1, 183.8 and 188. 7, respectively. In the Pico parishes, infant

mortality is even lower for the same period, with 113.3, 95.9 and 104.7, for males, females and both genders, respectively.

At 10 years of age per thousand births, 636 individuals had survived in Oliveira, 728 in Angústias, and 849 in the Pico parishes.

However, from the life expectancy table, we can see that death figures are slightly more favourable for generations born in Oliveira in the last two decades of the 19th century, in comparison to those born between 1835 and 1864. This improvement led to a drop in adult mortality.

**Final notes**

Over this three-century period, the basic sources for births, marriages and deaths have changed, and other serial sources have emerged, particularly in the 19th century, necessarily shaping methodological options.

Working at this time only on the central parish of the city of Guimarães, and limited by the lack of records on infant mortality for long periods of time, we were only able to observe, for the period before 1881, the survival of individuals in adulthood or sectors of the population that were theoretically more secluded from death. As the *róis de confessados* became census surveys in 1835, they have enabled us to calculate values for the life expectancy of children from stable families who were born between 1835 and 1864. Although we admit that the risk of death among children from these families was relatively low, the results obtained for the generations born in the two last decades of the 19th century do not discredit these values. This is an area of Portugal that in the first half of the 19th century was protected against epidemics that had a very strong impact on other parts of the country, as was the case of cholera, and then yellow fever. Nevertheless, the greater lack of sanitary conditions in urban areas and the concentration of foundling wheels in cities can cause a gap between urban and rural patterns with regard to death, as seems to be the case in the comparison with the Angústias parish, in the city of Horta..

In the course of the research we have developed, the results of the analysis of demographic behaviour from the 18th century seems be relatively sound, even those that were more difficult to examine, in relatively isolated rural communities, with systematic records of infant mortality and demographic-genealogical databases, prepared from the intersection of all events.

In urban communities, the volume of data and especially inter-parish mobility had a much more disturbing effect on the analysis of the more complex phenomenon of mortality, which suggested that intersecting urban centres with their surroundings could be useful.

We conclude with the conviction that the monitoring of life paths, from systematically organised demographic-genealogical databases, with the aim that they be successively enlarged, is the most reliable way to obtain a valid approach to the phenomenon of mortality in the long run.

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[ii] The databases referred to in this work were organized by Maria Norberta Amorim, with occasional support from experts.
[iii] We assume stable families as those for which we were able to obtain data on the survival of all children up to the age of seven years.
[iv] From the last years of the 19th century, not all *róis* include those under the age of 7.
[v] We have included inhabitants from the parish of S. Miguel do Castelo which, in the meantime, has been joined with the parish of Oliveira.
[vi] Faial and Pico are the two closest islands within the Archipelago of the Azores.
[vii] We detected in this roll a relative lack of records for children in their first years of life. We corrected it, by approximation, considering, in the database, those born and died in the three years prior to 1884, admitting, for those years, the systematic use of the infant mortality registry. Following this, we rejected the observations collected in the roll on individuals in their 1st, 2nd and 3rd years of life.
[viii] We believe that the inclusion of single individuals did not affect the result.
[ix] The parish of Angústias has a number of gaps in the death records between 1815 and 1843, compromising the analysis.
[x] The parishes of S. João and Ribeira, in the council of Lajes, and Santo Amaro and Prainha, in the council of S. Roque.

[xi] To compare statistically this fact, the chi-squared test was used as an adjustment test between the two independent samples. The test yielded a high corroboration value (close to 1), suggesting that there are no significant differences between the two groups.

[xii] The monitoring of life paths, on a case-by-case basis, is a very delicate and lengthy work that has only been developed, in the case of Horta, for the parish of Angústias.