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Alessio FORNASIN*, Marco BRESCHI**, Matteo MANFREDINI***,

Mortality Patterns of Cardinals (Sixteenth – Twentieth Centuries)

Cardinals are a population of dual interest for demographers. First, the demographic dynamics of this small group – their maximum number was limited to 70 between 1586 and 1973 – whose members are appointed at advanced ages, sheds light on the relationships between age at elevation, age at death, and the rate of renewal of the Sacred College. Second, the cardinals were a group of men living primarily in Rome and belonging to the economic elite. A comparison of their mortality with that of Italian and European populations reveals certain specific characteristics. Making use of a well-documented online database of cardinals, Alessio FORNASIN, Marco BRESCHI and Matteo MANFREDINI show that beyond the variations associated with political difficulties within the Catholic Church, the cardinals' life expectancy decreased in the nineteenth century, even falling below the mean level for European populations in the early twentieth century. The authors suggest several possible explanations for this counter-intuitive finding.

The field of demographic history boasts a strong tradition of studies on the mortality patterns of select populations, which can be divided into three strands: the first focuses on numerous minority groups, such as the Jews, the second concerns the elite classes (most often nobles), and the third examines demographic categories chosen on the grounds of determined attributes such as occupation (miners, fishermen, religious communities etc.). Focussing on these aggregates provides a means not only to examine the demographic behaviour of these populations, but also to trace their long-term evolution (Houdaille 1970 and 1989; Hollingsworth, 1977). Several data series dating back to the medieval period are available to scholars. They concern the upper classes or religious, particularly monastic, communities which are impossible to study using classical

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demographic methods (Hollingsworth, 1975; Biraben, 1977; Davis, 1998). For some of these groups, the datasets can be used to analyse the evolution of mortality rates over the course of several centuries (Zhao, 1997; Vandenbroucke, 1985). Obviously, great care should be taken in considering the particular inherent characteristics of these populations. For example, we can presume that the lifestyle of most religious groups would have protected them, at least in theory, from some of the risks of disease and fatal illness to which the non-religious community was exposed (Levin, 1996).

This article investigates the characteristics and levels of mortality among cardinals of the Catholic Church. The cardinal is an age-old figure dating back to the second century AD, and although his original role differed greatly from that of today, this institution has maintained a remarkable continuity over the last five hundred years, not only in terms of access to office, but also regarding the appointed duties and the number of members.

The information available on cardinals is extremely detailed and complete, with few or none of the usual difficulties related to truncated or censored data (Jonker, 2003; Houston, 1995; Houston and Prest, 1995). The information source used here is the catalogue of cardinals, compiled and constantly updated by Salvador Miranda and freely available online.⁽¹⁾ This database contains the biographies of the more than 4,000 cardinals known since AD 492. Each of these includes references and a large amount of information on each member of the Sacred College from the fifth century to today, including date and place of birth, date of elevation and date and place of death, although unfortunately the cause of death is often lacking.

With the aim of investigating aspects of the survival of this particular group over a number of centuries, this paper is divided into four parts. The first describes the main historical events related to the Sacred College between the modern and contemporary period. The second outlines this group's particular demographic characteristics and their evolution over time. The third examines issues related to the mortality levels of cardinals, drawing comparisons with other sectors of the population. The fourth and final part discusses the results of these analyses.

I. Cardinals: who are they and what are their duties?

Cardinals are high prelates who perform an essential role in the functioning of the Catholic Church, including electing the Pope and assisting him in office (Cardia, 1993, pp. 104-105). Their duties today differ very little from those eight hundred years ago.

(1) Salvador Miranda is the former Assistant Director for Collection Management at Florida International University Library of Miami. The website (www.fiu.edu/~mirandas/cardinals.htm), is recommended by some of the most important cultural institutions on the net. Further investigation has always confirmed the great accuracy and reliability of this source.

In turn, the cardinals are appointed by the Pope. The elevation ceremony occurs during the course of a consistory, the assembly of cardinals, where the Pope announces his wish to elevate a number of candidates to the rank of cardinal. However, he does not necessarily reveal their identity at this time and the names of one or more new cardinals can be retained, or, to use the correct term, reserved *in pectore*. It is thereafter the Pope's prerogative to release (or *espettorare*) these names, sometimes after a few months or years or even – if he takes this secret to the grave – never, in which case the oblivious cardinal *in pectore* has lost his appointment.

Since the Pope had independent choice in appointing cardinals, the selection criteria are liable to vary, according to the different sensibilities and needs of the Church and its Pontiff. This prerogative was often the result of compromises with outside authorities.

Over the centuries, the duties of cardinals have undergone some change, but the Sacred College's general regulations, practices and traditions have maintained a remarkable uniformity and underlying coherence.

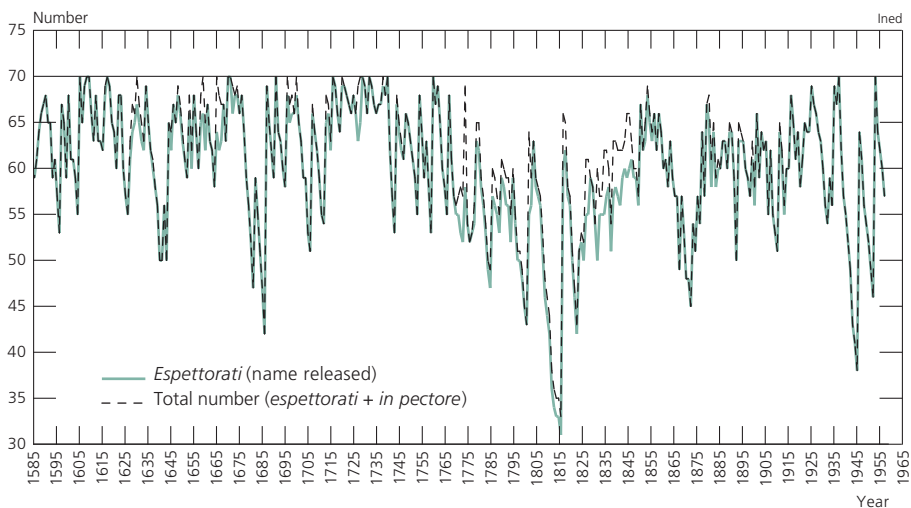
We have chosen 1586 and 1958 as the start and end points of the period under study. These dates are of demographic rather than historical importance, in that both mark regulatory interventions ruling on College size. While the maximum number was originally unspecified, with the *Postquam verus* constitution of 1586, Pope Sixtus V set the maximum at 70 in an attempt to curb his predecessors' tendency to confer the title upon ever growing numbers of aspirants. It was also at this time that the cardinal's role in assisting the Pope with his official duties was established. In 1973, the number was officially raised to 120 by Pope Paul VI, although the right to vote in conclave was limited to cardinals below 80 years old. However, even before this date, Pope John XXIII, with the opening consistory of his papacy in 1958, was the first to derogate from the 1586 constitution, and from then on the number of cardinals started to exceed the original limit (Riccardi, 1993).

Besides maintaining the same maximum size and institutional role for around five centuries, the Sacred College members also formed a somewhat homogeneous group. Firstly, cardinals formed an economic elite, with some extremely wealthy members and even those defined as "poor" being far from needy (Rosa, 1979, p. 1015). Another element of uniformity regards member nationality. Despite the universal nature of the Catholic Church, even at the beginning of the twentieth century almost all the cardinals were European and the overwhelming majority Italian, at least until the end of the Church's temporal power (Broderick 1987; Reinhard, 2000). An additional factor of partial homogeneity comes from place of residence. Curia members, who formed a large proportion of the College, were obliged to live in Rome, and only those with administrative responsibilities in a diocese, such as the Bishops of Milan, Paris and Madrid, were exonerated from this obligation. Cardinals can therefore be generally likened to an urban population.

II. Characteristics of the population of cardinals

Knowing the date of elevation to cardinal and that of when, for whatever reason, they ceased to hold this title, allows us to determine their exact daily number. Figure 1 shows the cardinal population on 1 January of each year from 1585 (papacy of Sixtus V) to 1958 (John XXIII), along with the distinction of those reserved *in pectore*.

Figure 1. Number of cardinals (name released [*espettorati*] or reserved [*in pectore*]), 1585-1958



Source: The Cardinals of the Holy Roman Church, www2.fiu.edu/~mirandas/cardinals.htm

In Figure 1, the horizontal line indicating the upper limit of 70 makes it clear that although the cardinal population comes close to and at times equals this number, it never actually exceeds it. Given that the elevation of cardinals was effectively in the Pope’s hands and unaffected by biological factors or calendar restraints, fluctuations in the population number depended more on new admissions than departures, or rather on how quickly vacancies were filled depending on the Pope’s chosen strategies.

Figure 1 illustrates that the population number frequently approaches and reaches the upper limit during the first 180 years, with the longest uninterrupted interval below 70 being between 1617 and 1670. In the subsequent period, this discrepancy is more pronounced, with a continuous shortfall for well over 150 years (1760-1938). During the period in question, the structural organization of the Church was in effect based on a number of cardinals closer to 50 or 60.⁽²⁾

(2) The College had an average number of 58.3 cardinals from 1751-1800, 55.3 from 1801-1850, and 60.0 from 1851-1900.

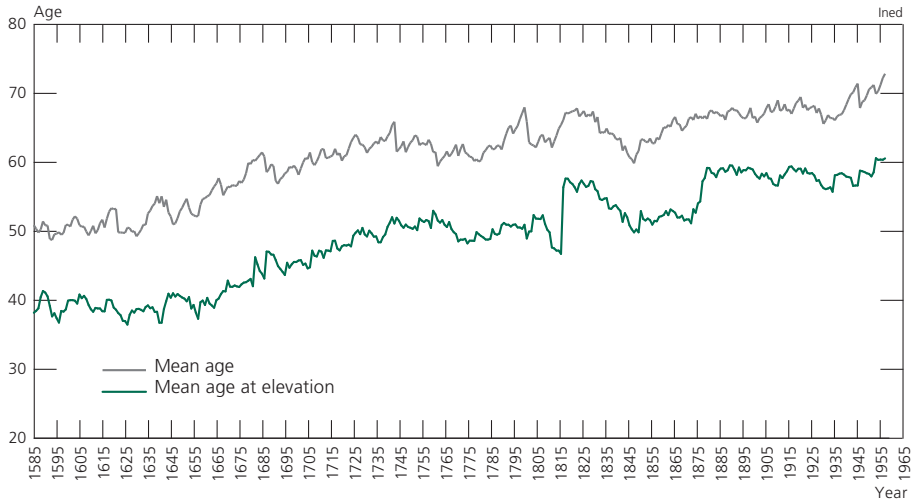
The practice of elevation *in pectore* can be seen to assume particular relevance in certain periods. Given that the limit on the total number of cardinals also applied to those not yet fully sanctioned, we can assume that the larger the “secret” population, the smaller the size of the “effective” group. The difference in number between these two groups increased when it was in the Pope’s interest to reserve the identity of certain candidates in order to nourish the hopes of aspirants who felt near to receiving this honour, thus eliciting their compliant behaviour (Broderick, 1987, p. 57). In fact, retaining this information was a means not only to postpone the decision but, above all, to make it dependant on the good conduct of candidates who, without fail, exceeded the number of actual places available. Indeed, this practice is repeatedly adopted during times of particularly strong political pressure.

As previously noted, the numerical disparity between the hypothetical maximum and actual population was especially evident after the mid-eighteenth century. In the historical context of the Enlightenment, the Church was confronted with a general repositioning of social values towards greater secularity, while from another perspective, the emerging Jansenistic doctrines challenged some of the foundations of secular power. Although this cultural climate is likely to have affected the number of elevations, after the French Revolution the size of the Sacred College was above all governed by political events. One of the two most evident low points in member numbers occurred during the Roman Republic (1798-1799), when the Pope was forced to reside away from Rome and the dissolution of papal rule led to general population decline in the city (Schiavoni and Sonnino, 1982; Caravale and Caracciolo, 1978). The second coincides with the Second World War (Riccardi, 1993).

Another aspect that demonstrates the demographic transformation of the Sacred College is the mean age of members, as illustrated in Figure 2. Up until the mid-eighteenth century, the mean age of cardinals rose steadily from just over 50 to above 60 years, then fluctuated sharply through to the mid-nineteenth century. The mean age then remained relatively stable for around 50 years, before increasing again from the 1930s.

Various factors could have affected the average age of cardinals. The upward trend during the seventeenth century is partly due to the dying out of the practice of recruiting young (and at times extremely young) candidates, who were often future heirs of grand Italian and European dynasties. The large fluctuations from the mid-eighteenth to mid-nineteenth centuries actually occur in a period when the age at elevation was quite stable. These “waves” are therefore a reflection of substitution uptake patterns (less frequent replacement of older cardinals by younger ones), especially at a time when the number of cardinals was at its lowest. The levelling out of these variations towards the mid-nineteenth century, with the mean age settling at 67-68 years around the turn of the century, and the increases evident from the 1940s, can be attributed to the general increase in life expectancy of the Italian population and the older age of cardinals at elevation.

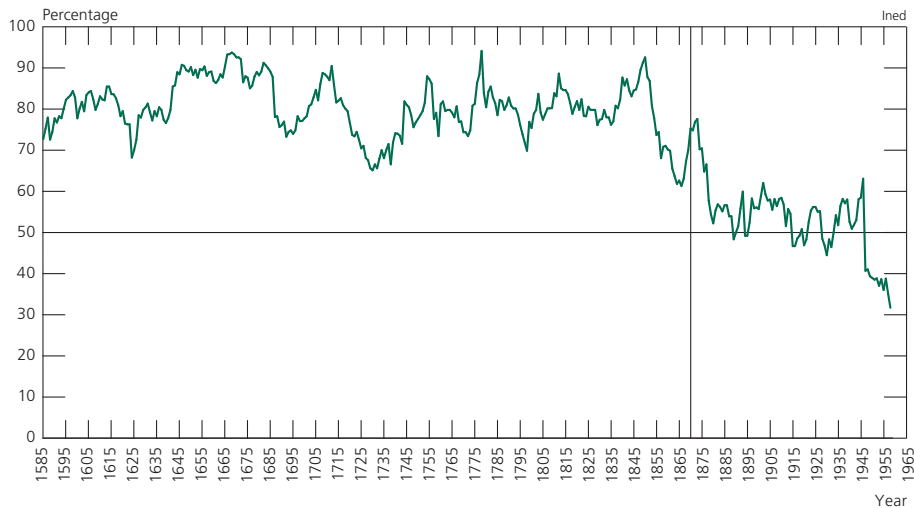
Figure 2. Mean age of cardinals of the Sacred College and mean age at elevation, 1585-1958



Note: The mean age at elevation refers to the age of the cardinals at appointment in the year in question.
Source: The Cardinals of the Holy Roman Church, www2.fiu.edu/~mirandas/cardinals.htm

Figure 3 examines the population of cardinals by place of birth. Until the mid-nineteenth century, around 80% of cardinals were Italian. This large majority became less pronounced after Pius IX ascended to the Papal throne in 1846. He elevated so few Italians to cardinal, especially after the end of the

Figure 3. Percentage of cardinals born in Italy, 1585-1958



Note: The year 1870 marks the end of Church's temporal power.
Source: The Cardinals of the Holy Roman Church, www2.fiu.edu/~mirandas/cardinals.htm

temporal power of the Church (1870), that their proportion was reduced to just over 50%. After the annexation of the Papal States to the Kingdom of Italy, with the consequence that even Italians became foreigners – and citizens of a hostile state at that – the Pope understandably chose to reduce the influence of Italian-born cardinals in the concerns of the Church (Broderick, 1987).

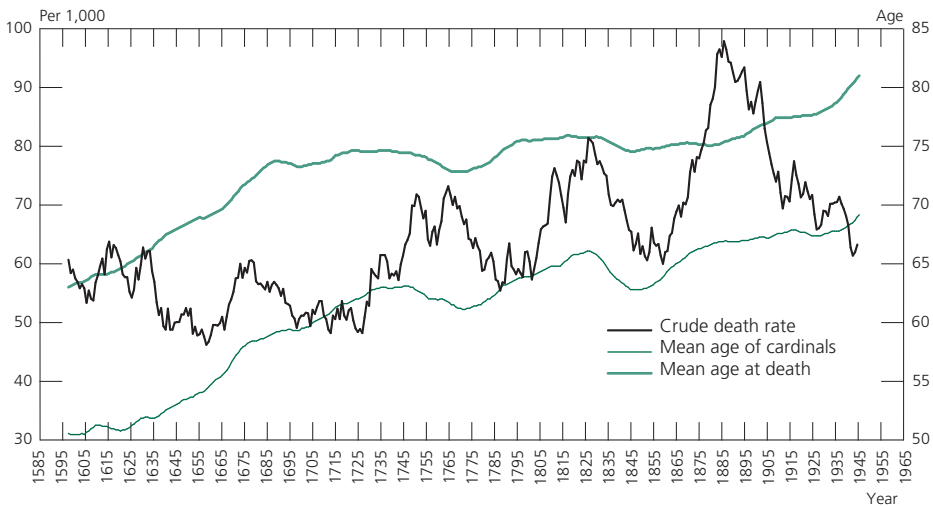
The proportion of Italian born cardinals nevertheless remained close to 50% until after the Second World War, and the papacy of Pius XII (1939-58) marked the start of a trend towards an increasing number of non-European cardinals (Reinhard 2000).

III. Mortality of cardinals

We have seen that the maximum number of cardinals was limited to 70 for the entire period under study. Although many cardinals were elderly, the number of annual deaths never actually exceeded 10, with an overall average of 3.9. However, given the extremely variable number of cardinals, it is far more useful to calculate this group's crude death rate as a means to trace its evolution over time. The population at risk is limited to cardinals who held the title at the time of death. In other words, those who had left office or been nominated Pope, even just one day before, were excluded from the numerator. A similar method was also used in the calculation of life tables (see Appendix for details).

Figure 4 plots the 25-year moving average of this indicator, revealing an upward trend in the death rate leading up to the early twentieth century. This

Figure 4. Crude death rate, mean age of cardinals and mean age at death, 1585-1958 (25-year moving averages)



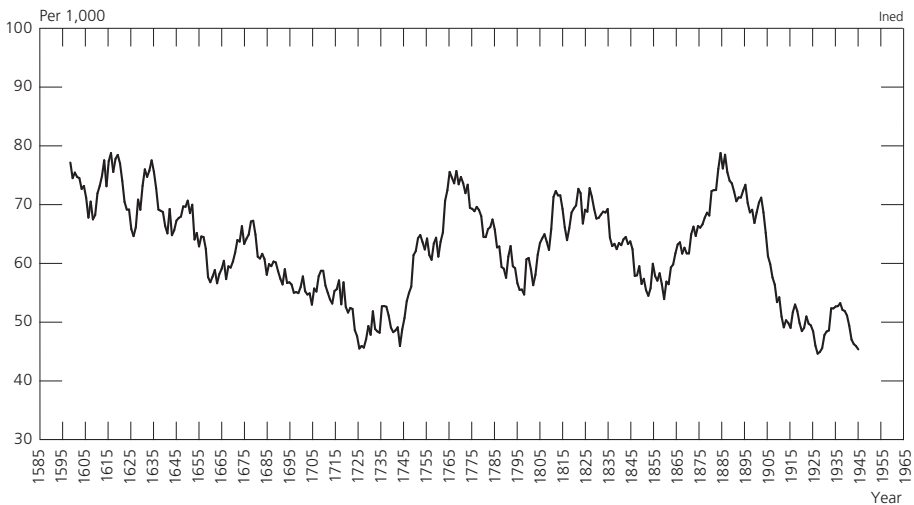
Note: The mean age at death refers to the age of the cardinals who died in the year in question.

Source: The Cardinals of the Holy Roman Church, www2.fiu.edu/~mirandas/cardinals.htm

is partly connected, both in the short and long term, to changes in the mean age of the cardinal population; a relationship that is interrupted only after the turn of the nineteenth century when the definitive decline in mortality rates began to take hold in the wider European context.

The evolution of the standardized crude death rate is far more explicit (Figure. 5).⁽³⁾ This pattern demonstrates a long-term downward trend, indicating that increases in mortality levels are due largely to the progressive ageing of the cardinal population. Nevertheless, even after compensating for this structural effect, three notable interruptions in the decline stand out: one in the third quarter of the eighteenth century, one at the beginning of the nineteenth century and another at the close of the nineteenth century. As previously noted, the first and third occur at particularly difficult moments in the history of the Catholic Church. The second half of the eighteenth century saw a slowdown in the turnover process, whereas one century later the College's composition underwent significant change in terms of the nationalities of its members.

Figure 5. Standardized crude death rate, 1585-1958 (25-year moving average)



Source: The Cardinals of the Holy Roman Church, www2.fiu.edu/~mirandas/cardinals.htm

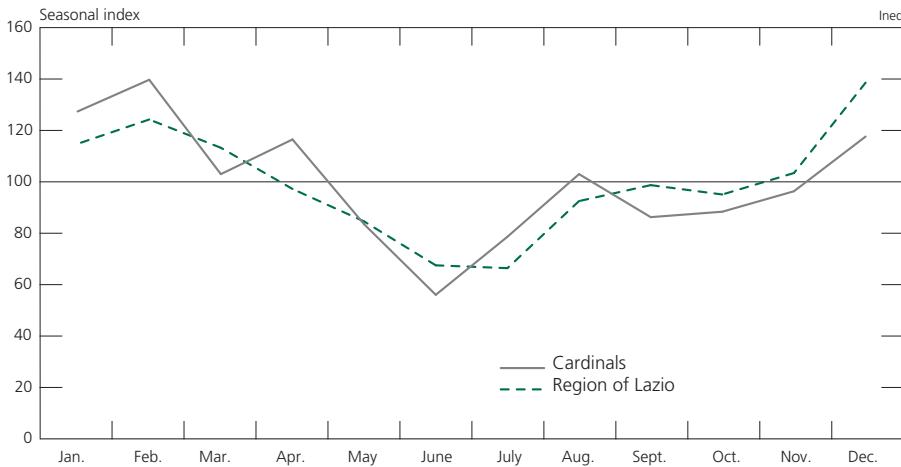
Epidemics had very little impact on the mortality rate of cardinals. Although the limited number of these events does rather weaken a short-term interpretation, there appears to be very little correlation between the mortality levels of cardinals and those of the population of Rome, the city where most cardinals

(3) Rates were standardized using the average age structure of the population of cardinals between 1585 and 1958.

lived.⁽⁴⁾ Cardinals can be considered “extraordinary” in being a select group composed mostly of elderly men, possibly protected from some typical causes of death that affected the general population.

The seasonal pattern of deaths of cardinals does comply with that for the elderly male population of Lazio (of which Rome is the capital), and in wider terms the whole of Italy, i.e. highest in winter, medium-high in summer (especially between August and September), lowest in spring and autumn (Figure 6). While this empirical evidence should be treated with caution given the small number of observations, the pattern appears to change little over the four centuries in consideration.

Figure 6. Seasonal pattern of deaths of cardinals (1850-1900) and the male population of the Lazio region, age 60 and over (1873-1875)

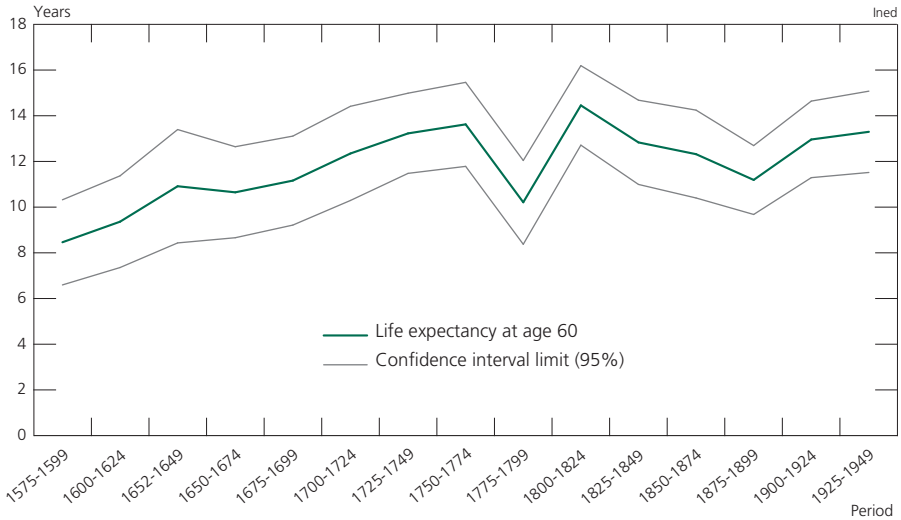


Source: The Cardinals of the Holy Roman Church, www2.fiu.edu/~mirandas/cardinals.htm; for the Lazio region, our calculations make use of the data in the population yearbook (MAIC 1873-1875).

Given the obvious difficulties in interpreting the crude death rate when applied to a population composed almost entirely of adults, the majority of whom are also elderly, it is far more useful to measure life expectancy at a particular age. The readings for this indicator were calculated at 25 year intervals from 1575 to 1950. We therefore use a series of cross-sectional figures in order to detect short-term fluctuations and then to draw comparisons with certain European populations. In fact, most documentation on the national population is based on the construction of period life tables by period of observation. Figure 7 presents the cardinals' life expectancy at age 60, which is the age we chose to focus on since it is close both to the mean and to the median age of the Sacred College members for much of the period under consideration.

(4) For example, at the time of certain well known epidemics, such as the cholera outbreak of 1837, no peak in the mortality of cardinals has been detected (Castiglioni, 1878; Sonnino, 1998).

Figure 7. Life-expectancy of cardinals at age 60 by 25 year periods, 1575-1950



Note: See Appendix for details of calculations.

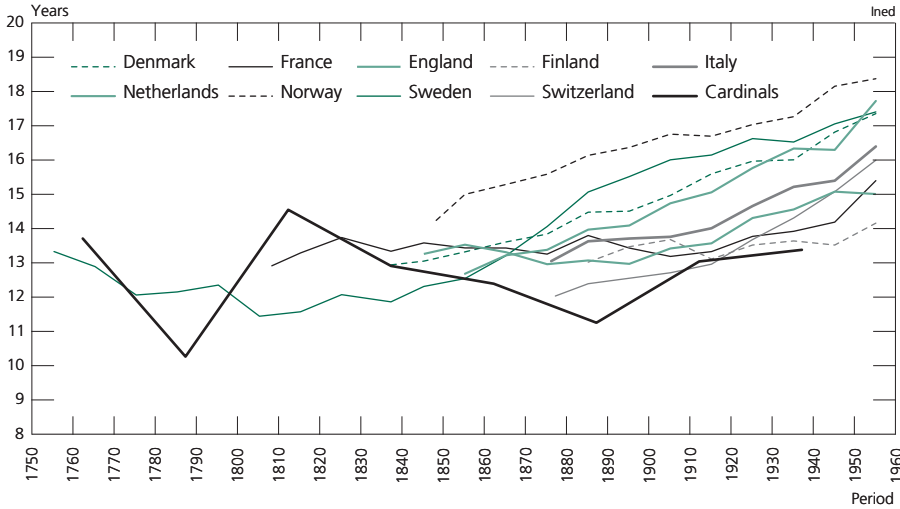
Source: The Cardinals of the Holy Roman Church, www2.fiu.edu/~mirandas/cardinals.htm

The empirical evidence presented above prompts a number of reflections. Between 1575 and 1949 the life-expectancy appears to increase significantly, rising from 8.5 years (± 1.9 years) to 13.4 years (± 1.8 years), with an average increase of around 1.3 years per century. The pace of progress is not regular, however. A growth phase between the first and second quarters of the seventeenth century is followed by a long relatively static period until the start of the eighteenth century; the mortality rate then starts to progressively fall and, despite a sharp inversion, a 60 year old cardinal could expect to live for around 14.5 years (± 1.8 years) in the first quarter of the nineteenth century. Over the final 125 years (from 1825 to 1949), not only are there no further increases, but there is actually a regression compared to the maximum level observed in 1800-24. Yet again, this indicator reveals 1775-99 and 1875-99 to be two “difficult” periods.

What stands out most is the absence of any improvements in life expectancy levels from the second quarter of the nineteenth century, a pattern which is notably out of keeping with that of the rest of Europe. Figure 8, which plots the life-expectancy at age 60 of nine male European populations between the decades 1750-1759 (Sweden only) and 1950-1959, makes this discrepancy very clear. All the European population curves (except Finland) rise from the end of the nineteenth century, but that regarding cardinals, tracing the mean value at 25 year intervals, while lacking any clear trend, is substantially lower than all the others. This difference is most pronounced with respect to Norway (almost 5 years), but is also significant in relation to Italy (around 2 years).

Only prior to 1870 are the life expectancy levels for cardinals in line with the majority of European populations.

Figure 8. Life-expectancy at 60 years (e_{60}) of cardinals and selected European male populations (1755-1955)

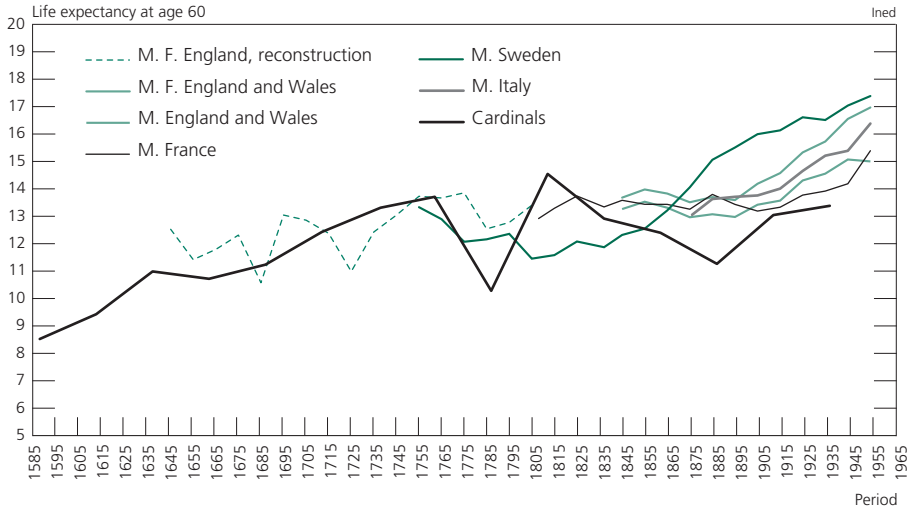


Source: The Cardinals of the Holy Roman Church, www2.fiu.edu/~mirandas/cardinals.htm; Human Mortality Database, University of California, Berkeley (USA), www.mortality.org; Max Planck Institute for Demographic Research, www.humanmortality.de

The cardinal population thus did not benefit from the definitive decline in the mortality rate that started to affect older age brackets from the second half of the nineteenth century. This situation is confirmed by comparison with the general English population, the only example of information (although sample based) on adult life-expectancy patterns from the middle of the seventeenth century, again calculated at the age of 60 (Figure 9). These figures cover the general (male and female) English population up to 1810, and then both the general and male only populations from 1840 to 1960. The graph also plots the e_{60} series, at 10 year intervals, for Sweden (from 1750), France (from 1805) and Italy (from 1872). The first two were selected both for their extended time span as well as their differing trajectories during the transition, and the Italian data, despite their brevity, are highly relevant given that many cardinals, besides being Italian in most cases, habitually lived in Rome.

Again what is striking is the lower life expectancy of cardinals from the start of the nineteenth century, but also the heavy price that cardinals paid in terms of longevity in the last quarter of the eighteenth century, a negative trend that can also be observed to some extent for the English and Swedish populations. In the early period, the cardinal population did not have any particular advantage (at least in terms of life expectancy) over the general English population, whose male component, at least based on available empirical evidence (Wrigley et

Figure 9. Life-expectancies at age 60 (e_{60}) of cardinals and of general populations in France, England, Italy and Sweden, 1587-1955



Source: The Cardinals of the Holy Roman Church, www2.fiu.edu/~mirandas/cardinals.htm; Human Mortality Database, University of California, Berkeley (USA), www.mortality.org; Max Planck Institute for Demographic Research, www.humanmortality.de; Wrigley et al., 1997, pp. 305-306.

al., 1997, pp. 305-306), did not suffer a disadvantage such as that witnessed from the mid-nineteenth century.

Considering all the above points, a number of observations appear to gain additional strength:

- The cardinal population does not appear to have benefitted in any way from the general process of decline in the mortality rate that took hold in Europe from the second half of the nineteenth century;
- The cardinal population suffered a noticeably negative period towards the end of the eighteenth century, and another less perceptible one in the late nineteenth century, which was a time of significant increases in e_{60} throughout the rest of Europe (especially in the north);
- in addition to showing no improvement over the periods 1630-1770 or 1830-1940, the life expectancy of a 60-year-old cardinal was not far off that of a “standard” English villager during the seventeenth-eighteenth centuries.

The empirical evidence presented here on the longevity of cardinals appears therefore to disagree with normal expectations and, above all, is at odds with previous research. Numerous past empirical studies remark upon the lower death rate of religious figures compared with the general population. However, most of this documentation regards more recent, young or adult populations (King and Bailar, 1969; Flannelly et. al., 2002). Research on earlier periods is even more controversial, with much emphasis on the greater life expectancy of religious groups, such as the French Benedictines between the seventeenth

and eighteenth century (Le Bras and Dinet, 1980, p. 373) and the monks of Westminster Abbey at the end of the medieval period (Harvey, 1993, pp. 132-134). Even Franco Savorgnan (1940), in the only demographic study, to our knowledge, directly concerning cardinals, claims that the life expectancy of these prelates was consistently higher than that of the Italian male population at all ages from 55 years on.⁽⁵⁾

Notable differences do exist, however, between various types of religious figures. Within the regular clergy, for example, there is a considerable difference between the life expectancy of Benedictines, who spent their lives in monasteries, and Jesuits, who were in close contact with general society. Lay clergy also had life expectancy levels very similar to those of the local communities in which they worked and were partially immersed. On this subject, see the example of the Latin American or French bishops between the modern and contemporary period (Gutierrez, 1986; Houdaille, 1980).

At this point, our findings suggest that cardinals are more comparable with religious figures considered at risk, such as Jesuits or missionaries, whose life expectancy was indeed below that of the general population (Salvini, 1979; Boldrini and Uggé, 1926) than with most monastic orders, who had a more reclusive lifestyle and enjoyed a longer life.

IV. Discussion – Conclusion

The evidence presented so far, especially that based on contemporary populations, suggests that the mortality patterns of cardinals can be plausibly interpreted considering the cultural and political context in which their life expectancy levels dropped, particularly for the cases that stand out from the last quarter of the eighteenth and the second half of the nineteenth century. The first period notably coincides with the French Revolution and Napoleonic rule of the peninsula, when, after the deposition of Pope Pius VI as temporal sovereign (1798), even the capital of Christendom became hostile territory, and not only were a number of cardinals incarcerated, but the Pope himself died in custody. The second period largely overlaps with the Risorgimento, a time when the Church State was under constant pressure, first from the Kingdom of Sardinia and then from that of Italy. In 1848, the Pope, along with many cardinals, was forced to seek refuge in Gaeta to escape the climate of revolt preceding the creation of the Republic of Rome. In 1859, a large number of papal territories were annexed to the Kingdom of Sardinia, and the temporal power of the Church finally came to an end in 1870 (Zizola, 2005). However, although these factors go some way in explaining the larger picture, it remains

(5) Savorgnan's findings refer to cardinals "who were members of the Sacred College on 1 January 1845 and those thereafter until 13 March 1868, whose date of birth was before 1810". The resulting mortality levels cannot be interpreted as either cohort or cross-sectional measures. Given these premises, the findings can be considered to underestimate the death rate.

difficult to justify the generally low life expectancy levels of such a select group in other periods.

Cardinals typically represent an urban sub-population, with most of them living in the same city, namely Rome. Their relatively low life expectancy levels can therefore be connected to the high mortality levels of urban contexts. Poor conditions of hygiene and sanitation were typical of large urban conglomerations, and Rome was no exception to this rule. Moreover, up until the beginning of twentieth century, the city was surrounded by vast marshy areas infested by mosquitoes, and malaria was a common cause of death among its inhabitants (Corti, 1987). Victims of the disease included Pope Urban VII (Benzoni, 2000). Furthermore, malaria typically causes a high number of deaths among the older population.

However, the life expectancy of cardinals who died in Rome is no lower than that of cardinals who died elsewhere. This suggests that there are additional contributing factors, possibly connected to other characteristics of this particular group.

Franco Savorgnan claims the reason for the longevity of religious groups lies in their “calm of spirit” as well as “the regularity of the daily habits [...] sobriety, moderation” (Savorgnan, 1940, p. 19). Hence, if cardinals were at a relatively high risk of dying, we can presume that their lifestyles were less sober or moderate than those of the rest of the male population. However, as is always the case when attempting to generalize from individual behaviour, it would be difficult to demonstrate that cardinals’ lifestyles were less “virtuous” than those of laymen.

As mentioned, previous studies repeatedly claim that elite groups had a higher than average life expectancy (Vedrenne-Villeneuve, 1961; Perrenoud, 1975; Hollingsworth, 1977; Blum et al., 1990). However, these differences were primarily determined during childhood and early adulthood. For example, the seven year gap between the life expectancy of the English peerage and general population manifests itself almost entirely in the first years of life (Hollingsworth, 1977, p. 342). This situation is even more apparent in Geneva during the seventeenth century, when the difference in life expectancy at birth between the poorest and wealthiest classes reached an estimated 17 years (Perrenoud, 1975, p. 238). Naturally, this type of observation is impossible in the case of cardinals, given that their appointment was by nomination and usually late in life. However, the fact that the overwhelming majority of cardinals came from extremely well-to-do families, which would have certainly conferred an advantage in terms of life expectancy, leads us to believe that their reduced longevity was actually due to factors that came into play after their elevation. In some cases, the honour of receiving the title may have been a kind of “career” bonus, with the Pope “rewarding” individuals who were well-deserving but also fragile or in ill health. However, the mortality levels for the immediate years after nomination fail to support this hypothesis.

Cardinals are not the sole example of this phenomenon. In certain age brackets, some elite groups can lose a prior advantage in terms of mortality, as is the case of the English peerage in adulthood, whose life expectancy fell below that of the general population while at the service of the crown. However, not all such negative factors are so clearly definable. For an individual who joined an elite group at a given age, levels of exposure to certain risks could undergo a kind of transition, with increased protection from the moment of membership. In the modern period, there is the example of the Scottish advocates, a hereditary but certainly socioeconomically modest group compared with nobles or other high prelates, whose life expectancy exceeded that of the rest of the population later in life. This can be largely attributed to the habits specific to their social class of origin, such as extensive travel, city living, and the dissipate life of a student; a lifestyle that tends to weed out the weakest and to strengthen survivors (Houston, 1992, p. 54). We can hypothesize the opposite in the case of cardinals, who, although originating from a well protected social class, lost this previous advantage to some degree when faced with the duties connected with office.⁽⁶⁾

Based on the above considerations, we can identify four characteristics shared by nearly all the cardinal population which could have contributed to their low life expectancy levels:

- Cardinals wielded substantial power and therefore had no lack of enemies, which undoubtedly put them at a higher risk of meeting a violent death. This would have been especially true in certain periods, when cardinals were the object of assassination attempts or fell victim to plots hatched either by themselves or by others. Poisoning was extremely commonplace between the fifteenth and sixteenth century (beyond the scope of our analysis) and is strongly suspected as the cause of death for ten or more cardinals. This was obviously not the only means of assassination, and we cannot exclude the possibility that other apparently natural deaths actually conceal a violent crime. A number of cardinals who survived attempts on their lives were left injured, which may well have hastened their subsequent demise.⁽⁷⁾

- An ecclesiastical career leading to the cardinal's scarlet cassock was usually the preserve of especially wealthy families or individuals with recognized power. In both cases, aspiring to such an important position called for a consolidated network of relations, that could be either part of a natural aristocratic heritage or, for the less privileged, the sum of relations with influential people built up over time. The forming and/or maintaining of these

(6) This criterion would appear to disagree with what is known about the risks connected to the mortality levels of religious figures in general, insofar as future cardinals would have already been exposed to some of the risks that they later faced. Nevertheless, we are still left with the impossibility of establishing the survival patterns of subjects who did not yet belong to the group under study.

(7) It should be stressed that many victims of a violent death due to changes in the Church's senior hierarchy have already been excluded from the numerator in our calculations, insofar as they were generally stripped of their title before execution.

high society relations would have involved frequent travel over long distances, and the career leading up to appointment as a cardinal involved numerous stages, not only in relation to the ecclesiastical function itself but also in terms of contact with select locations. A glance at any cardinal's biography, irrespective of their fame, leaves no doubt that studies pursued at various Catholic schools and universities were a practically universal stage in their career. Diplomatic assignments were also frequent, some in the direct role of papal nuncio in a European capital, some with particular tasks to perform, and others, early in the career, at the service of nobles or other high prelates.

Even those cardinals who led a more sedentary life after elevation did not always stay in the same city. While they spent most of their time in Rome, travelling was frequently necessary, partly due to the obligations of such a high dignitary position. There were also the Papal elections, which subjected electors to long and, at times, extremely arduous journeys. Cardinals' frequent travel may have translated into a disadvantage in terms of survival, due not only to the considerable discomfort (at least until recent times) of travelling even a few miles, but also to the real dangers that were sometimes encountered.

- Cardinals undoubtedly came into contact with a large number of people, with a typical day involving numerous engagements with friends, companions, subordinates, beggars, etc., all of whom were obliged to observe the ritual of kissing his ring. Although difficult to quantify, we cannot exclude the possibility that this face-to-face contact translated into a greater chance of contracting certain contagious diseases that, in turn, hastened the death of some cardinals.

- A number of authors also suggest that the high mortality levels of certain elite groups are connected to dietary excesses. A cardinal's diet was certainly richer and more copious than that of the average person and was probably far from being balanced and healthy, as was true for many other religious figures, such as the Benedictine monks of Canterbury Abbey who reportedly ate in excess (Hatcher, 1986, p. 34). There is also abundant anecdotal evidence on the clergy's dietary habits, especially those of the regular clergy, which would appear to support this assumption, but many doubts still remain about their possible effects on mortality (Livi Bacci, 1989, p. 108).

In conclusion, our findings lead us to believe that singular mortality patterns of cardinals can be attributed to risks associated with their behaviour and lifestyle. We have demonstrated that the lowest points in their life expectancy coincide with the most difficult political periods faced by the Church. Nevertheless, cardinals were penalized in terms of longevity throughout the eighteenth and nineteenth century and it was only from the 1930s that their life expectancy began to significantly improve, nearing that of the general population.

This lag is most likely due to cardinals being exposed to risk factors that differed from those encountered by the general population. The improvements

in living standards of European populations in the second half of the nineteenth century mainly concerned socioeconomic conditions rather than public health and hygiene. The life expectancy of cardinals improved and equalled that of the rest of the population only once they were able to benefit from these improvements in the fields of court life, transport and medicine, with the effect of reducing the specific risk factors to which they were previously exposed.

APPENDIX

Calculation of life expectancy

To construct the cardinals' life tables, certain characteristics inherent to this population must be taken into account:

- the low number of group members (maximum 70);
- admission into the group at a relatively advanced age (average age of 55.4 years);
- admission into the group by nomination alone (comparable to immigration);
- departure from group due not just to death but also to election as Pope or renunciation of the title (3.7% of the total number, comparable to emigration);
- the relatively short duration of group membership (average of 15.4 years);

These characteristics and the low number of events make the more traditional calculation of probability via age-specific rates unsuitable. Instead, we chose a method that uses probabilities calculated by cohort and period.

To draw comparisons with other populations, the tables were constructed by period of death. Life expectancy was calculated using the life tables with 25 year intervals. For each interval, death probabilities were calculated for each single age.

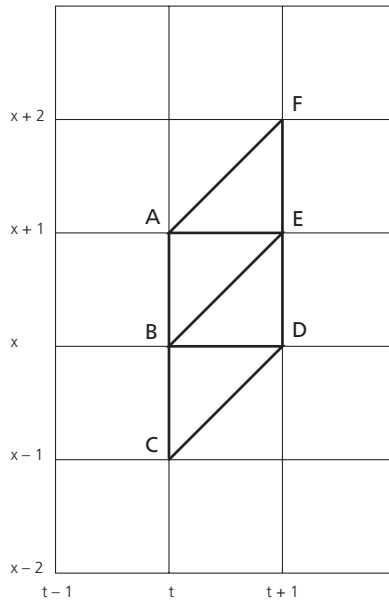
For the calculation of death probabilities, the numerator is the number of deaths over a 25-year period for each age. The denominator is the sum of all cardinals in office at the start of each year plus the fractions of time in office of those who were either appointed later in the year or had lost their title before the end of the year. Therefore, in a theoretical sense, since cardinals are appointed by nomination and lose this title due not only to death but also to renunciation, dismissal or elevation to the papal throne, the admissions and departures (for reasons other than death) from the group can be treated as immigrations and emigrations.

This method allowed us to maintain consistency between numerator and denominator in the calculation of probability. In fact, the denominator was always greater or equivalent to the numerator and therefore the equality $q_{\omega-1} = 1$ was always verified.

However, bias cannot be totally excluded. Following the scheme developed in the Lexis diagram, the death probability at age x and at time t , has a value between $ABEF/AB$ and $BCDE/BC$.

Choosing just one of the two measures could give rise to biased life expectancy levels – either above or below the true figure by some months. To correct for this, two life tables were constructed for each 25-year interval and

life expectancy at 60 years was simply the average between the two life tables values.



An alternative method, still cross-sectional, but with the addition of probabilities calculated by cohort, produced almost identical results. There is still a minor error, in that by using 25-year intervals, the events in the lower, left-hand triangle relative to the first year of the 25 year cycle are missing, and those in the upper, right-hand triangle for the 26th year, are added. The final method adopted was chosen over the above in order to form a perfect time match in the cross-sectional analysis.

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Alessio FORNASIN, Marco BRESCHI, Matteo MANFREDINI • MORTALITY PATTERNS OF CARDINALS (SIXTEENTH – TWENTIETH CENTURIES)

This article investigates the characteristics and mortality patterns of cardinals in the Catholic Church between the sixteenth and twentieth centuries. Cardinals are high prelates who perform an essential role in the functioning of Catholic Church, and whose main duties are to elect and assist the Pope in office. Thanks to a database containing remarkably accurate and continuous biographical data on cardinals since the fifth century, some of their specific demographic characteristics can be analysed. During the study period (1586-1958), the Sacred College of Cardinals, with a maximum of 70 members, formed a fairly homogeneous group. Nearly all cardinals came from the economic elite, the majority were Italian-born and held residence in Rome. Their life expectancy levels during the seventeenth and eighteenth centuries are not dissimilar to those of "ordinary" European villagers. However, a striking observation is the subsequent absence of significant improvements in these levels from the 1830s onward; a pattern which is notably out of keeping with most of the rest of Europe. This may be due to the risks associated with the cardinals' behaviours and lifestyles. The periods in which lower life expectancies are observed coincide with the most turbulent political times for the Church. Cardinals were nonetheless penalized throughout the eighteenth and nineteenth centuries, and it was not until the 1930s that their life expectancy started to catch up with that of the general population.

Alessio FORNASIN, Marco BRESCHI, Matteo MANFREDINI • LA MORTALITÉ DES CARDINAUX (XVI^e-XX^e SIÈCLES)

Cet article étudie les caractéristiques et la mortalité des cardinaux de l'Église catholique du XVI^e au XX^e siècle. Les cardinaux remplissent un rôle essentiel dans l'Église : ils forment le Sacré collège, élisent le pape et l'assistent. Grâce à une base de données remarquable par la précision et la continuité des informations biographiques recueillies depuis le V^e siècle, il est possible d'en analyser certaines spécificités. Durant la période étudiée (1586-1958), ils représentaient un groupe relativement homogène de 70 membres au maximum, résidant à Rome, pour la plupart nés en Italie et issus de l'élite économique. Leur espérance de vie aux XVII^e et XVIII^e siècles ne différait guère de celle des villageois ordinaires, mais l'aspect le plus frappant est qu'à partir des années 1830, elle ne s'est pas améliorée de manière significative, contrairement à la plupart des pays d'Europe. Les particularismes de la mortalité des cardinaux tiennent à des risques associés à leurs comportements et leurs styles de vie. Les périodes lors desquelles on observe les espérances de vie les plus faibles coïncident avec celles qui sont les plus difficiles pour l'Église d'un point de vue politique. Les cardinaux furent néanmoins pénalisés en termes de longévité tout au long des XVIII^e et XIX^e siècles, et c'est seulement à partir des années 1930 que leur espérance de vie commença réellement à progresser, se rapprochant de celle de la population générale.

Alessio FORNASIN, Marco BRESCHI, Matteo MANFREDINI • LA MORTALIDAD DE LOS CARDENALES (XVI-XX SIGLOS)

Este artículo estudia las características de la mortalidad de los cardenales de la Iglesia Católica, desde el siglo XVI hasta el *siglo* XX. Los cardenales desempeñan un rol esencial en la Iglesia : forman el Colegio Sagrado, eligen al papa y lo asisten. Gracias a una base de datos admirable por la precisión y la continuidad de las informaciones biográficas recogidas desde el V^o siglo, es posible analizar ciertos caracteres específicos de este colectivo. Durante el periodo estudiado (1586-1958), representan un grupo relativamente homogéneo de 70 miembros al máximo, que residen en Roma, mayoritariamente nacidos en Italia y provenientes de la élite económica. Su esperanza de vida durante los siglos XVII y XVIII apenas los distinguía de los aldeanos ordinarios, pero el hecho más notable es que, a partir de 1830, aquella no se mejoró de forma significativa, al contrario de lo que sucedió en la mayoría de los países europeos. Esta especificidad de los cardenales italianos se debe a riesgos asociados a sus comportamientos y estilo de vida. Los períodos durante los cuales su esperanza de vida es más baja coinciden con los más difíciles para la Iglesia en la esfera política, aunque los cardenales fueron penalizados en términos de longevidad a lo largo de los siglos XVIII y XIX. Es sólo a partir de los años 1930 que su esperanza de vida comienza realmente a progresar y a acercarse a la de la población general.

Keywords: mortality, religion, cardinals, life expectancy at age 60, sixteenth-twentieth centuries