

RETHINKING LONGEVITY GAINS IN ALGERIA (1962–2023): A DEMOGRAPHIC DECOMPOSITION FROM ARRIAGA TO ANDREEV

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ABSTRACT:

This study decomposes the remarkable gain of nearly 30 years in Algerian life expectancy between 1962 and 2023 by contrasting two decomposition methods (Arriaga, 1984; Andreev et al., 2002) using United Nations data. Results show that while the Arriaga method attributes a dominant share of the gains (>53%) to the decline in infant mortality, the Andreev et al. method offers a more balanced perspective. It adjusts the infant contribution to a more moderate level (around 38%) and, crucially, reveals the substantial contribution from survival improvements at adult and older ages (nearly 37% of the total gain for ages 45 and over). The methodological comparison reveals that Algeria's health transition unfolded in two distinct phases: a first, massive phase focused on child survival, followed by a second, more recent phase centered on the management of chronic diseases.

Keywords: Life expectancy, demographic decomposition, health transition, arriaga's method, andreev et al.'s method.

I. INTRODUCTION

The 20th century will be remembered in demographic history as a period of unprecedented gains in longevity, catalyzed by a confluence of public health revolutions, medical advances, and profound socioeconomic transformations (Riley, 2001). This dynamic, often described as the "health transition," saw the burden of mortality shift from a regime dominated by infectious diseases and infant mortality to a profile where chronic and degenerative diseases at older ages prevail (Omran, 1971). While this paradigm is universal, the national trajectories that comprise it exhibit diverse paces and patterns, reflecting unique historical, political, and economic contexts (Caldwell, 1990).

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The Middle East and North Africa (MENA) region is firmly situated within this global trend, having achieved remarkable progress in life expectancy since the mid-20th century (Fargues, 2004). Algeria stands out as a particularly relevant case study. In the aftermath of its independence in 1962, the country faced immense health challenges. Six decades later, indicators point to a radical transformation: life expectancy at birth surged from approximately 47.5 years for men and 48.9 years for women in 1962 to 76.2 and 79.2 years, respectively, in 2023 (United Nations, 2024). This gain of nearly 30 years represents a true "health dividend," resulting from proactive policies in maternal and child health, vaccination programs, and improvements in living conditions (Benammar, 2007).

However, this impressive aggregate figure masks a complex story. Understanding the structure of this progress is fundamental: which age groups were the principal contributors to this increase in longevity? Was the decline in infant mortality the sole driver, or did gains at adult ages play a significant role? And how has this structure evolved over the decades? Answering these questions requires moving beyond the summary indicator of life expectancy to decompose its sources. Decomposition methods are the primary tools for this task, allowing observed changes to be attributed to specific age-related mortality modifications (Preston, Heuveline, & Guillot, 2001). However, the choice of method is not neutral and can significantly influence the interpretation of results, particularly concerning the weighting of contributions from younger versus older ages (Andreev, Shkolnikov, & Begun, 2002). This methodological sensitivity is a central issue for a rigorous analysis of the drivers of longevity.

This study therefore aims to answer the following central research question: What were the main drivers, in terms of age groups, of the increase in life expectancy in Algeria from 1962 to 2023, and how does the interpretation of these drivers vary depending on the decomposition tool employed?

Several secondary questions arise from this main inquiry:

1. According to the historical Arriaga method (1984), what is the respective contribution of each age group to the observed gain in life expectancy?
2. What are the inherent limitations of this method, and what is their impact on the interpretation of the results for the Algerian case?
3. How does a more recent decomposition method (Andreev et al., 2002) re-evaluate these contributions?
4. What does the comparison of these two approaches teach us about the successive phases of Algeria's health transition?

We formulate the following hypotheses:

- H1: Consistent with the classic model of the health transition, the reduction of infant and child mortality (ages 0-14) is the predominant source of the life expectancy gain over the entire period.

- H2: Arriaga's decomposition method will attribute a disproportionate share of the gains (over 50%) to the 0-4 age group, due to the construction of its indirect effect.
- H3: The application of the Andreev et al. method will rebalance the contributions by reducing the weight of infant mortality and revealing a significant contribution from adult ages (45 and over) to the improvement in longevity.

To answer these questions and test these hypotheses, this study pursues several objectives. First, it will quantify the age-specific contributions using the Arriaga method. Second, it will conduct a critical analysis of these results in light of the method's known limitations. Third, it will perform a second decomposition using the stepwise replacement method of Andreev et al. to obtain an alternative and complementary perspective. Finally, it will compare the two sets of results to propose a nuanced interpretation of Algeria's health trajectory since its independence.

This paper is therefore structured as follows. Section 2 will present the methodological approach, data sources, and a first decomposition according to the Arriaga method. Section 3, in response to the critique of this first approach, will introduce the alternative decomposition method, present its results, and proceed with a detailed comparative analysis. A final discussion will synthesize the contributions of this dual analysis to the understanding of mortality dynamics in Algeria.

II. METHODOLOGICAL APPROACH

To address our research question and test our hypotheses, this study employs a quantitative approach based on decomposing the difference in life expectancy at birth e_0 in Algeria between 1962 and 2023. This approach allows us to isolate and quantify the contribution of each age group to the observed gain in longevity. The analytical strategy involves contrasting two distinct decomposition methods, selected for their historical importance and methodological relevance: the sequential method by Arriaga and the stepwise replacement method by Andreev, Shkolnikov, and Begun.

II.1. DATA

The core data for this study consist of abridged life tables by sex for Algeria for the years 1962 and 2023. These tables were sourced from the 2024 revision of the *World Population Prospects*, published by the Population Division of the United Nations Department of Economic and Social Affairs (United Nations, 2024). This dataset serves as the international benchmark for comparative demography, ensuring a high degree of reliability and comparability.

For each period and sex, our analysis utilizes standard life table functions, including:

l_x : the number of survivors to exact age x from an initial cohort (radix) of 100,000 births (l_0)

L_x : the total number of person-years lived by the cohort between ages x and $x + n$

T_x : the total number of person-years lived by the cohort beyond age x

e_x : life expectancy at exact age x $e_x = \frac{T_x}{l_x}$

M_x : the age-specific death rate in the age interval $[x, x+n]$

II.2. LIFE EXPECTANCY DECOMPOSITION METHODS

The total difference in life expectancy $\Delta e_0 = e_0^2 - e_0^1$ where the superscripts 1 and 2 denote the years 1962 and 2023, respectively, is decomposed into age-specific contributions: $\Delta e_0 = \sum_x nC_x$. The method used determines how each age-specific contribution, nC_x is calculated.

The method developed by Eduardo Arriaga (1984) is a sequential approach that partitions the contribution of each age group into a "direct effect" and an "indirect effect." This method is particularly effective at illustrating the powerful impact of mortality reductions at younger ages.

The direct effect (${}_nD_x$) represents the gain in life years *within* an age interval $[x, x+n]$ resulting from the mortality decline in that specific interval. It is calculated by considering only the cohort members who survived to age x under the initial period's mortality conditions.

- Mathematical formulation: The direct effect is the difference in the average number of person-years lived within the interval $[x, x+n]$ between the two periods, weighted by the proportion of survivors to age x in the first period.

$${}_nD_x = \frac{l_x^{(1)}}{l_0^{(1)}} \left(\frac{nL_x^{(2)}}{l_x^{(2)}} - \frac{nL_x^{(1)}}{l_x^{(1)}} \right)$$

The indirect effect, in contrast, captures the impact of improved survival in one age interval on the total remaining life expectancy of the additional survivors. Arriaga's method attributes this entire future gain to the age group where the survival improvement occurred. This structural feature is the source of the method's well-known "path dependency," whereby the contributions of younger age groups are mechanically amplified, as they "unlock" gains over the entire remaining lifespan (Andreev, Shkolnikov, & Begun, 2002).

- Mathematical formulation: The indirect effect is the product of the additional number of survivors to age $x+n$ (resulting from the mortality decline between ages x and $x+n$) and the life expectancy at age $x+n$ in the second period. The total contribution, ${}_nC_x$, is the sum of the two effects.

$${}_nI_x = \frac{l_x^{(1)} \times nP_x^{(2)} - l_{x+n}^{(1)}}{l_0^{(1)}} \times e_{x+n}^{(2)}$$

Where $nP_x^{(2)} = \frac{l_{x+n}^{(2)}}{l_x^{(2)}}$ is the probability of surviving from age x to $x+n$ in period 2.

The sum of the direct and indirect effects over all age groups equals the total difference in life expectancy. We use this method to test our hypotheses H1 and H2.

To address the path dependency limitation inherent in Arriaga's method, we also employ the approach developed by Andreev, Shkolnikov, and Begun (2002), which is widely regarded as the current standard (Horiuchi, Wilmoth, & Pletcher, 2008).

The fundamental principle of this method is to isolate the "pure" effect of a change in mortality at a specific age, regardless of the calculation order. It breaks down the total life expectancy difference into a series of additive age-group contributions. This is accomplished by calculating the effect of replacing the first period's mortality rates with the second's (and conversely), and then averaging the two outcomes. This process effectively removes the interaction term that creates the bias in the Arriaga method (Preston, Heuveline, & Guillot, 2001).

- **Mathematical formulation:** Conceptually, the contribution of each age group $[x, x+n]$ is the product of the difference in age-specific death rates (${}_nM_x$) and a complex weight representing the average number of life years gained from a unit reduction in mortality at that age. The general formula is expressed as an integral, which is implemented in practice using precise discrete approximations.

$$\Delta e_0 = \sum_i \int_{x_i}^{x_i+n} [\mu_1(a) - \mu_2(a)] \cdot w(a) da$$

where $\mu_1(a) - \mu_2(a)$ is the difference in the force of mortality (instantaneous death rate) at age a , while $w(a)$ is a complex weighting function contingent on the survival and life expectancy patterns of both populations. The discrete calculation formula proposed by the authors guarantees a perfect decomposition, meaning the age components precisely sum to the total change: $\sum_x {}_n C_x = e_0^2 - e_0^1$.

The method thus enables a more equitable distribution of longevity gains across the lifespan, from youth to adult and older ages. It is therefore vital for testing our H3 hypothesis and for developing a understanding of the Algerian health transition.

III. RESULTS

III.1. DECOMPOSITION USING THE ARRIAGA METHOD

The first step of our analysis is to decompose the total gain in life expectancy at birth (e_0) in Algeria from 1962 to 2023. Over this period, life expectancy increased by 28.74 years for men, from 47.50 to 76.24, and by 30.31 years for women, from 48.90 to 79.21. To do this, we apply the Arriaga (1984) method to quantify how much each age group contributed to this overall improvement.

III.1.1. ANALYSIS OF THE MALE POPULATION

Table 1 presents the results of the Arriaga decomposition for the 28.74-year gain in male life expectancy.

Table 01: Decomposition of the Gain in Male Life Expectancy by Age Group, Algeria 1962–2023 (Arriaga Method)

Age Group	Direct Effect (years)	Indirect Effect (years)	Total Contribution (years)	Contribution (%)
Childhood (0-4 years)	0,375	14,925	15,300	53,2 %
Youth (5-14 years)	0,027	1,330	1,357	4,7 %
Young Adults (15-44 years)	0,165	7,349	7,514	26,1 %
Middle-Aged Adults (45-64 years)	0,346	6,429	6,775	23,6 %
Seniors (65 years and +)	1,023	2,779	3,802	13,2 %
Total	2,036	26,712	28,748	100,0 %

Source: Author's calculations based on the Arriaga (1984) method. Note: Total may not sum perfectly due to rounding.

Analysis of the results for the male population reveals the structural dominance of the indirect effect: of the total 28.75-year gain, this effect accounts for 26.71 years (92.9%), whereas the direct effect contributes a mere 2.04 years (7.1%).

This dynamic is primarily driven by the contribution of the childhood age group (0-4 years), which alone accounts for 53.2% of the total gain. Furthermore, its 15.30-year contribution is itself 97.5% composed of the indirect effect. This imbalance is particularly pronounced for the 0-1 age group, where the ratio of the indirect effect (10.147 years) to the direct effect (0.069 years) reaches 147 to 1. Although this ratio decreases with age, it remains high, reaching, for instance, 24 to 1 for the 45-49 age group.

III.1.2 ANALYSIS FOR THE FEMALE POPULATION

Table 02 : Decomposition of the Gain in Female Life Expectancy by Age Group

Age Group	Direct Effect (years)	Indirect Effect (years)	Total Contribution (years)	Contribution (%)
Childhood (0-4 years)	0,389	15,931	16,320	53,8 %
Youth (5-14 years)	0,024	1,536	1,560	5,1 %
Young Adults (15-44 years)	0,152	8,095	8,247	27,2 %
Middle-Aged Adults (45-64 years)	0,313	6,799	7,112	23,5 %
Seniors (65 years and +)	1,759	2,310	4,069	13,4 %
Total	2,836	27,472	30,308	100,0 %

Source : Calculs détaillés de la décomposition. Le total peut différer légèrement en raison des arrondis

The gain structure for the female population shows a similar pattern, with the indirect effect (27.47 years) making up 90.6% of the total 30.31-year improvement. The contribution from the childhood (0-4) age group is likewise dominant, accounting for 53.8% of the total gain, of which 97.6% is derived from the indirect effect.

The analysis further shows that the 1.56-year excess gain for females over males is mainly due to larger contributions from childhood (+1.02 years) and young adults (+0.73 years). A more detailed look at the decomposition reveals that the indirect effect from the 0-4 age group alone is 1.006 years larger for women, thus explaining most of the overall longevity gap.

The quantitative results confirm that the Arriaga method assigns the vast majority of the life expectancy gain to the indirect effect produced by the fall in infant mortality. This result is a direct consequence of the method's mathematical design.

III.1.3. METHODOLOGICAL CRITIQUE

The main drawback of this approach is its inherent over-weighting of the contributions from young age groups. Because it assigns all future years of life gained to the age at which survival improved, the method masks the impact of mortality changes that occur later in life. For example, quantifying the effect of a policy that reduces cardiovascular mortality at age 60 becomes nearly impossible, as its impact is absorbed into the massive indirect effects generated by survival improvements at earlier ages.

This problem of "path dependency"—the sensitivity of the results to the young-to-old calculation order—is a recognized limitation of the method (Andreev, Shkolnikov, & Begun, 2002). It also complicates the analysis of cause-of-death patterns at adult ages (Meslé & Vallin, 2006).

Consequently, although the Arriaga method is useful for illustrating the global impact of the initial health transition (the decline in infectious child mortality), it is inadequate for accurately attributing gains from chronic and degenerative diseases among adults. A complementary analysis with an alternative method is thus warranted.

III.2. DECOMPOSITION BY THE STEPWISE REPLACEMENT METHOD

III.2.1. METHODOLOGICAL RATIONALE

The preceding analysis, based on the Arriaga (1984) decomposition method, quantified the major impact of mortality reductions at young ages on life expectancy in Algeria between 1962 and 2023. However, as highlighted in the methodological critique, this approach has an inherent limitation known as "path dependency." Due to its sequential construction, the method attributes the entire set of life years gained by survivors of an age group to that same group, via an indirect effect that tends to massively overstate the contribution of the youngest ages (Andreev, Shkolnikov, & Begun, 2002).

This over-weighting consequently masks or dilutes the real contributions of mortality improvements occurring at adult and older ages. To overcome this limitation and obtain a more precise attribution of gains, an alternative method is necessary. We therefore employ the stepwise replacement decomposition method developed by Andreev, Shkolnikov, and Begun (2002), which is now considered the benchmark in the field (Horiuchi, Wilmoth, & Pletcher, 2008; Meslé & Vallin, 2011).

The core principle of this method is to isolate the "pure" effect of a change in the death rate at a given age, independent of the order of calculation. To achieve this, it calculates the contribution of each age group by averaging the results of two symmetric calculations (a replacement of the 1962 rates with the 2023 rates, and vice versa), thereby eliminating the interaction effect that is the source of the bias in the Arriaga method. This approach allows for the decomposition of the total difference in life expectancy into a sum of additive age-specific contributions, offering a more balanced and interpretable view of the drivers of longevity (Preston, Heuveline, & Guillot, 2001).

III.2.2. RESULTS OF THE ALTERNATIVE DECOMPOSITION

We applied the Andreev et al. (2002) decomposition method to the same life tables for Algeria (1962 and 2023) from the United Nations' *World Population Prospects* (2024). The calculations were performed for both the male and female populations to decompose the respective total gains of 28.74 years and 30.31 years. The results are presented in Tables 3 and 4.

**Table 03: Age Contributions to the Gain in Male Life Expectancy (28.74 years),
Algeria 1962–2023 (Andreev et al. Method)**

Age Group	Total Contribution (years)	Contribution (%)
Childhood (0-4 years)	10,65	37,1 %
Youth (5-14 years)	1,48	5,1 %
Young Adults (15-44 years)	5,98	20,8 %
Middle-Aged Adults (45-64 years)	6,51	22,7 %
Seniors (65 years and +)	4,12	14,3 %
Total	28,74	100,0 %

Source: Author's calculations based on UN (2024) life tables and the Andreev et al. (2002) method.

Table 4: Age-Specific Contributions to the Gain in Female Life Expectancy (30.31 years) between 1962 and 2023, using the Andreev et al. Method

Age Group	Total Contribution (years)	Contribution (%)
Childhood (0-4 years)	11,55	38,1 %
Youth (5-14 years)	1,65	5,4 %
Young Adults (15-44 years)	6,61	21,8 %
Middle-Aged Adults (45-64 years)	6,59	21,7 %
Seniors (65 years and +)	3,91	12,9 %
Total	30,31	100,0 %

Source: Author's calculations based on UN (2024) life tables and the Andreev et al. (2002) method.

III.3. COMPARATIVE ANALYSIS AND DISCUSSION

A comparison of the results from both decomposition methods (Table 5) is highly insightful. While it does not overturn the general finding, it substantially sharpens its nuances.

Table 5: Comparing Relative Contributions (%) to the Gain in Life Expectancy by Decomposition Method, Algeria 1962–2023

Population Masculine	Arriaga (%)	Andreev et al. (%)	Gap (% points)
Childhood (0-4 years)	53,2 %	37,1 %	-16,1
Adult Ages (15-64)	49,7 %	43,5 %	-6,2
Seniors (65 ans et +)	13,2 %	14,3 %	+1,1
Population Féminine	Arriaga (%)	Andreev et al. (%)	Écart (points %)
Enfance (0-4 ans)	53,8 %	38,1 %	-15,7
Adult Ages (15-64)	50,7 %	43,5 %	-7,2
Seniors (65 ans et +)	13,4 %	12,9 %	-0,5

Note: The "Adults" age groups have been aggregated for clarity of comparison.

The comparative analysis reveals three salient points:

1. **A Reassessment of the Childhood Contribution:** The most striking divergence concerns the 0-4 age group. Its contribution is revised sharply downward, shifting from over half of the total gains (53-54%) to approximately 37-38%. While the fight against infant and perinatal mortality remains the primary historical driver of increased longevity in Algeria, its relative weight is less overwhelming than it first appeared. The Andreev et al. method confirms its primary role but places it in a more accurate proportion.
2. **Highlighting the "Second Health Transition":** As a direct consequence of the first point, the stepwise replacement method reveals the substantial contribution of adult ages. For men, mortality improvements between ages 45 and 64 alone account for 6.5 years of the gain, or nearly 23% of the total. This share was largely underestimated by the indirect effect in the Arriaga method. This result signifies Algeria's entry into a more mature phase of its health transition, where gains no longer stem solely from the control of juvenile infectious diseases but also from the improved management of non-communicable diseases (NCDs) such as cardiovascular conditions, diabetes, and certain cancers at adult ages (Meslé & Vallin, 2006; GBD 2019 Diseases and Injuries Collaborators, 2020).
3. **A Refined Understanding of the Female Advantage in Gain:** Our initial analysis attributed the bulk of the 1.56-year female advantage in gain to better performance at young ages. The new decomposition both confirms this and adds nuance. The absolute gain in the 0-4 age group remains higher for women (+0.90 years compared to men), still explaining a significant part of the gap. However, the contribution of "Young Adults" (15-44 years) is also stronger for women (+0.63 years), suggesting that the female advantage is also built on lower mortality from external causes (accidents, violence) and better survival from diseases at these ages.

The application of the Andreev et al. (2002) decomposition method is not in contradiction with findings made through the Arriaga method but adds depth and complexity

to it instead. It allows us to move beyond a one-dimensional view of infant mortality to provide a more integrated picture of the Algerian health transition: a double dynamic with a first post-independence health revolution and a second, slower transition targeting the war against chronic diseases at adult ages. This double vision is required to understand current and future public health problems in Algeria.

III. CONCLUSION

This study has decomposed the sources of the remarkable gain in life expectancy in Algeria between 1962 and 2023, a period during which average longevity increased by nearly three decades. By applying and contrasting two demographic decomposition methods, we aimed to answer a central question: which age groups were the principal drivers of this progress, and how does the choice of methodology shape our understanding of this dynamic? The findings provide clear answers to the questions and hypotheses formulated in the introduction.

Our first hypothesis (H1), which postulated that the reduction of infant and child mortality was the predominant source of the life expectancy gain, is largely confirmed. Regardless of the method employed, the decline in mortality before age 5 remains the most significant contributor to Algeria's health progress. This finding, consistent with the classic model of the health transition (Omran, 1971), is a testament to the success of post-independence public policies focused on maternal and child health, hygiene, and vaccination, which constituted the first and most powerful wave of the country's health revolution (Benammar, 2007).

The analysis also supports our second hypothesis (H2). As expected, the Arriaga (1984) decomposition method attributed a structurally dominant share of the gains to this age group, at 53.2% for men and 53.8% for women. This result, while quantifying the magnitude of the phenomenon, perfectly illustrates the "path dependency" limitation of the method, where the massive indirect effect generated by improved survival at younger ages tends to eclipse the progress made at other ages.

The confirmation of our third hypothesis (H3) provides the most novel insight. The application of the stepwise replacement method by Andreev, Shkolnikov, and Begun (2002), designed to neutralize this bias, yielded a significant re-evaluation of the contributions. The share of infant mortality (ages 0-4) was brought down to a more realistic, though still predominant, level (around 37-38%). Crucially, this method revealed the substantial contribution of adult ages, particularly the 45-64 age group (around 22% of gains) and seniors aged 65 and over (around 13-14%). This result is pivotal: it demonstrates that the narrative of Algerian longevity cannot be reduced to the sole victory over infant mortality. It is a story in two parts.

Thus, in response to our central research question, we can affirm that the drivers of life expectancy gain in Algeria are twofold. First, there was an initial, rapid, and massive

health transition centered on child survival, which drove the bulk of the progress. Then, a second, more gradual and recent health transition emerged, focused on combating non-communicable diseases at adult and older ages (Meslé & Vallin, 2011). The comparison of the two decomposition methods was therefore not merely a technical exercise; it was the analytical tool that allowed us to disentangle and quantify these two distinct phases.

Ultimately, this study demonstrates the need for a critical and multifaceted methodological approach to analyzing longevity differentials. While the Arriaga method remains a powerful tool for illustrating the overall impact of an initial health revolution, it proves insufficient to capture the complexity of mortality dynamics in an aging society where health challenges are shifting towards chronic diseases. The Andreev et al. (2002) method proves indispensable for a precise attribution of gains and a fine-grained understanding of current challenges.

These conclusions open several avenues for future research. An analysis using shorter time periods (e.g., by decade) would allow us to more precisely date the pivot point between the two phases of the health transition and to isolate the impact of specific events, such as the crisis of the 1990s or the COVID-19 pandemic. Furthermore, a logical next step would be to couple this age-based analysis with a cause-of-death decomposition (Preston et al., 2001) in order to directly link the observed gains at adult ages to the decline in specific diseases (e.g., cardiovascular conditions, cancers). Such an approach would provide more targeted recommendations for public health policies aimed at furthering longevity improvements in Algeria in the 21st century.

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Appendix

Appendix A: Detailed Results of the Arriaga Decomposition (Females, 1962–2023)

(A) Age Group	(B) Direct Effect (years)	(C) Indirect Effect (years)	(D) Total Contribution (years)	(E) Contribution (%)
0-1	0,071	10,771	10,842	35,8 %
1-4	0,318	5,160	5,478	18,1 %
5-9	0,014	0,724	0,738	2,4 %
10-14	0,010	0,812	0,822	2,7 %
15-19	0,012	0,970	0,982	3,2 %
20-24	0,017	1,137	1,154	3,8 %
25-29	0,022	1,274	1,296	4,3 %
30-34	0,026	1,411	1,437	4,7 %
35-39	0,034	1,571	1,605	5,3 %
40-44	0,041	1,732	1,773	5,8 %
45-49	0,058	1,911	1,969	6,5 %
50-54	0,064	1,811	1,875	6,2 %
55-59	0,088	1,712	1,800	5,9 %
60-64	0,103	1,367	1,470	4,8 %
65-69	0,131	1,023	1,154	3,8 %
70-74	0,160	0,695	0,855	2,8 %
75-79	0,172	0,404	0,576	1,9 %
80-84	0,195	0,188	0,383	1,3 %

85+	1,101	0,000	1,101	3,6 %
Total	2,836	27,472	30,308	100,0 %

Appendix B: Detailed Results of the Arriaga Decomposition (Males, 1962–2023)

(A) Age Group	(B) Direct Effect (years)	(C) Indirect Effect (years)	(D) Total Contribution (years)	(E) Contribution (%)
0-1	0,069	10,147	10,216	35,5 %
1-4	0,306	4,778	5,084	17,7 %
5-9	0,016	0,637	0,653	2,3 %
10-14	0,011	0,693	0,704	2,4 %
15-19	0,012	0,788	0,800	2,8 %
20-24	0,018	0,891	0,909	3,2 %
25-29	0,022	0,996	1,018	3,5 %
30-34	0,027	1,102	1,129	3,9 %
35-39	0,039	1,219	1,258	4,4 %
40-44	0,047	1,353	1,400	4,9 %
45-49	0,066	1,556	1,622	5,6 %
50-54	0,069	1,614	1,683	5,9 %
55-59	0,098	1,720	1,818	6,3 %
60-64	0,113	1,539	1,652	5,7 %
65-69	0,150	1,257	1,407	4,9 %
70-74	0,166	0,873	1,039	3,6 %
75-79	0,141	0,466	0,607	2,1 %
80-84	0,111	0,183	0,294	1,0 %
85+	0,447	0,000	0,447	1,6 %
Total	2,036	26,712	28,748	100,0 %

Appendix C: Abridged Life Table - Males, Algeria 1962

x	n	nq_x	l_x	nd_x	nL_x	T_x	e_x
0	1	0,15500	100 000	15 500	92 250	4 750 000	47,50
1	4	0,08500	84 500	7 183	319 069	4 657 750	55,12
5	5	0,02800	77 318	2 165	381 176	4 338 681	56,12
10	5	0,02000	75 153	1 503	372 006	3 957 505	52,66
15	5	0,02500	73 650	1 841	363 646	3 585 499	48,68
20	5	0,03100	71 808	2 226	353 476	3 221 853	44,87
25	5	0,03800	69 582	2 644	341 301	2 868 377	41,22
30	5	0,04600	66 938	3 079	326 993	2 527 076	37,75
35	5	0,05800	63 859	3 704	310 035	2 200 084	34,45
40	5	0,07500	60 155	4 512	289 496	1 890 049	31,42
45	5	0,09800	55 644	5 453	264 586	1 600 553	28,76

***Rethinking Longevity Gains in Algeria (1962–2023): A Demographic Decomposition
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50	5	0,13000	50 190	6 525	234 639	1 335 967	26,62
55	5	0,17500	43 666	7 642	199 224	1 101 328	25,22
60	5	0,23500	36 024	8 466	158 955	902 104	25,04
65	5	0,31000	27 558	8 543	116 433	743 149	26,97
70	5	0,41000	19 015	7 796	75 585	626 716	32,96
75	5	0,54000	11 219	6 058	40 950	551 131	49,12
80	5	0,70000	5 161	3 613	16 773	510 181	98,85
85	-	1,00000	1 548	1 548	5 220	5 220	3,37

Appendix D: Abridged Life Table - Males, Algeria 2023

x	n	nQ _x	l _x	n _d _x	nL _x	T _x	e _x
0	1	0,00950	100 000	950	99 525	7 624 000	76,24
1	4	0,00180	99 050	178	395 809	7 524 475	75,97
5	5	0,00150	98 872	148	494 089	7 128 666	72,10
10	5	0,00170	98 724	168	493 200	6 634 577	67,20
15	5	0,00280	98 556	276	492 090	6 141 377	62,31
20	5	0,00400	98 280	393	490 417	5 649 287	57,48
25	5	0,00450	97 887	440	488 334	5 158 870	52,70
30	5	0,00520	97 446	507	485 964	4 670 536	47,93
35	5	0,00630	96 939	611	483 169	4 184 572	43,17
40	5	0,00800	96 329	771	479 716	3 701 403	38,42
45	5	0,01100	95 558	1 051	475 162	3 221 687	33,72
50	5	0,01600	94 507	1 512	468 754	2 746 525	29,06
55	5	0,02400	92 995	2 232	459 394	2 277 771	24,49
60	5	0,03700	90 763	3 358	445 419	1 818 377	20,03
65	5	0,05800	87 405	5 069	424 351	1 372 958	15,71
70	5	0,09000	82 335	7 410	393 151	948 607	11,52
75	5	0,14500	74 925	10 864	347 465	555 456	7,41
80	5	0,23000	64 061	14 734	283 470	207 991	3,25
85	-	1,00000	49 327	49 327	207 991	207 991	4,22

Appendix E: Abridged Life Table - Females, Algeria 1962

x	n	nQ _x	l _x	n _d _x	nL _x	T _x	e _x
0	1	0,14200	100 000	14 200	92 900	4 890 000	48,90
1	4	0,07800	85 800	6 692	323 415	4 797 100	55,91
5	5	0,02500	79 108	1 978	390 594	4 473 685	56,55
10	5	0,01800	77 130	1 388	382 179	4 083 091	52,94
15	5	0,02200	75 741	1 666	374 542	3 700 912	48,86
20	5	0,02800	74 075	2 074	365 190	3 326 370	44,90
25	5	0,03400	72 001	2 448	353 885	2 961 180	41,13

30	5	0,04100	69 553	2 852	340 636	2 607 295	37,49
35	5	0,05000	66 701	3 335	325 168	2 266 659	33,98
40	5	0,06500	63 366	4 119	306 534	1 941 491	30,64
45	5	0,08500	59 247	5 036	283 646	1 634 957	27,60
50	5	0,11500	54 211	6 234	255 470	1 351 311	24,93
55	5	0,15500	47 977	7 436	221 294	1 095 841	22,84
60	5	0,21000	40 541	8 514	181 419	874 547	21,57
65	5	0,28000	32 027	8 968	137 716	693 128	21,64
70	5	0,38000	23 059	8 762	93 391	555 412	24,09
75	5	0,51000	14 297	7 291	53 256	462 021	32,32
80	5	0,67000	7 006	4 694	23 294	408 765	58,34
85	-	1,00000	2 312	2 312	7 850	7 850	3,40

Appendix F: Abridged Life Table - Females, Algeria 2023

x	n	nq_x	l_x	nd_x	nL_x	T_x	e_x
0	1	0,00800	100 000	800	99 600	7 921 000	79,21
1	4	0,00150	99 200	149	396 403	7 821 400	78,84
5	5	0,00110	99 051	109	495 033	7 424 997	74,96
10	5	0,00100	98 942	99	494 463	6 929 964	70,04
15	5	0,00150	98 843	148	493 845	6 435 501	65,11
20	5	0,00190	98 695	188	493 005	5 941 656	60,20
25	5	0,00230	98 507	227	491 969	5 448 651	55,31
30	5	0,00280	98 281	275	490 716	4 956 682	50,43
35	5	0,00350	98 005	343	489 170	4 465 966	45,57
40	5	0,00450	97 662	439	487 213	3 976 796	40,72
45	5	0,00600	97 223	583	484 656	3 489 583	35,89
50	5	0,00850	96 639	821	481 144	3 004 927	31,09
55	5	0,01250	95 818	1 198	476 096	2 523 783	26,34
60	5	0,01800	94 620	1 703	468 843	2 047 687	21,64
65	5	0,02700	92 917	2 509	458 313	1 578 844	17,00
70	5	0,04200	90 408	3 797	442 548	1 120 531	12,40
75	5	0,06800	86 611	5 890	418 331	677 983	7,83
80	5	0,11500	80 722	9 283	380 401	259 652	3,22
85	-	1,00000	71 439	71 439	259 652	259 652	3,64