LIFE EXPECTANCY AT 80.96 YEARS AT BIRTH AND AT 19.61 YEARS AT THE AGE OF 65

In 2020-2022, **life expectancy at birth** was estimated at 80.96 years, 78.05 years for males and 83.52 years for females, following an increase of 0.01 years for males and a decrease of 0.01 years for females from the previous triennium, still as a result of the increase in the number of deaths in the context of the COVID-19 disease pandemic.

Within a decade, there was a gain of 1.18 years of life for the total population, 1.38 years for males and 0.92 years for females. This increase in female life expectancy at birth resulted mainly from a reduction in mortality among those aged 60 years and over. For males, these gains continued to be mainly due to the decrease of mortality below 60 years.

Life expectancy at age 65, in 2020-2022, was estimated at 19.61 years for the total population. Men aged 65 years could expect to live 17.76 years, and women aged 65, 20.98 years, which corresponded to a slight decrease (0.01 years) for men and no change in life expectancy at age 65 of women compared to 2019-2021. In the last ten years, life expectancy at age 65 has increased 9.7 months for men and 8.5 months for women.

Statistics Portugal releases on its website – www.ine.pt – the 2020-2022 complete life tables for Portugal, by sex and for the total resident population, providing the official values of life expectancy for the same period.

As announced in the press release of November 29th, 2022, regarding "Life expectancy at age 65 – Provisional data 2020-2022", Statistics Portugal also publishes the revised series of complete mortality tables for Portugal for the period 2010-2012 to 2019-2021, as well as the revised value of the provisional estimate of life expectancy at age 65, released in November 2022.

Following the release of the Definitive Resident Population Estimates 2011-2020 series, on March 31st, 2023, the estimates of the population exposed to the risk of death were recalculated, proceeding with the reconstruction of the Complete Life Tables for Portugal and, consequently, the revision of the indicators derived from these, namely life expectancy at birth and at age 65.
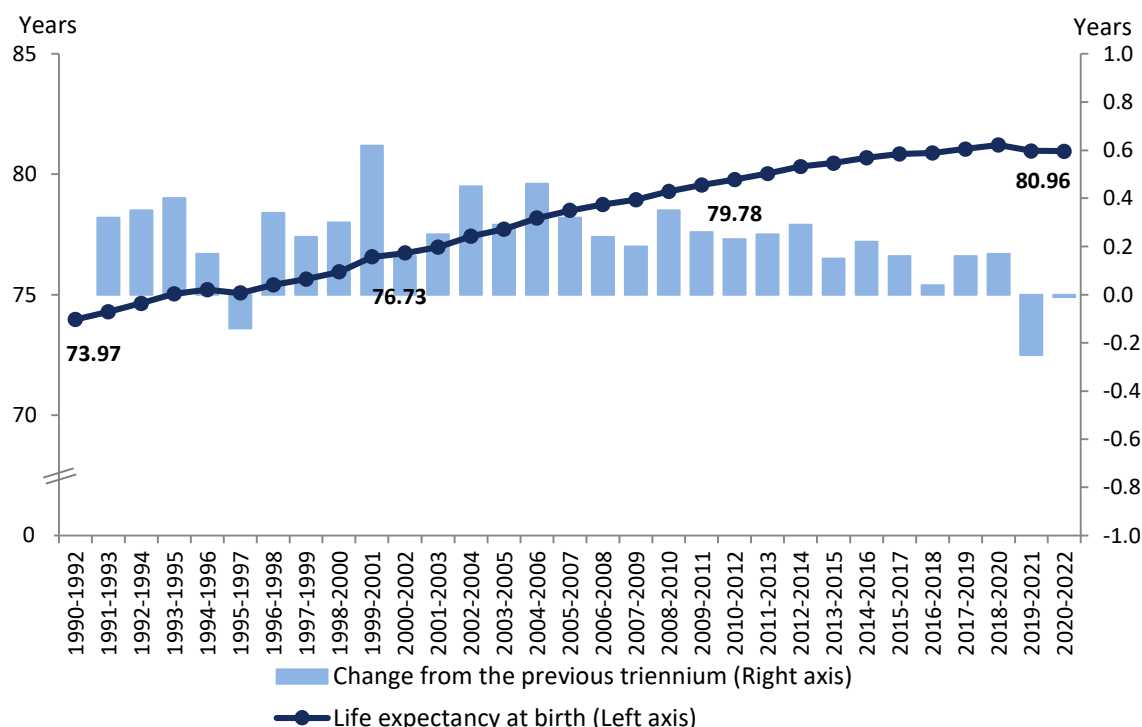
Life expectancy at birth of 80.96 years

Life expectancy at birth for both males and females were estimated at 80.96 years, which corresponded to a reduction of 0.01 years (0.12 months) compared to the previous triennium (80.97 years), still as a result of the increase in the number of deaths in the context of the COVID-19 disease pandemic.

In the 2020-2022 triennium, mainly due to the decrease recorded in 2019-2021 (-0.25 years), life expectancy at birth receded to values lower than those estimated for 2017-2019 (81.05 years).
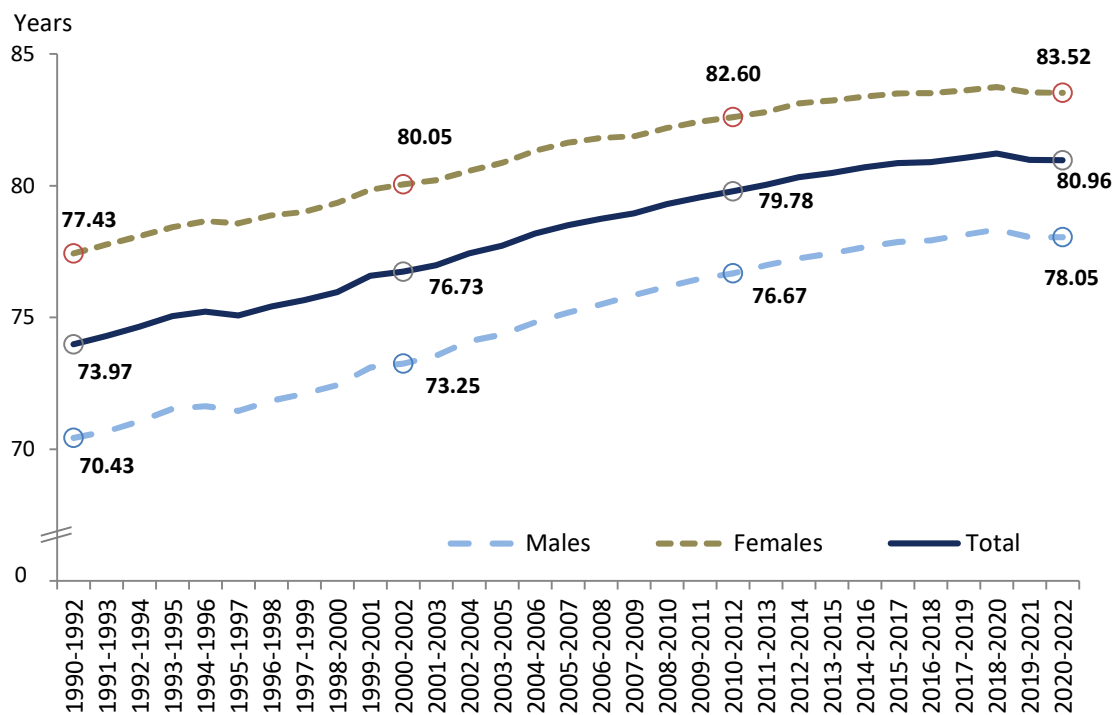
Figure 1. Life expectancy at birth, Portugal, 1990-1992 to 2020-2022

Source: Statistics Portugal, Complete Life Tables.

At birth, men could expect to live 78.05 years and women 83.52 years, which represented, relative to the estimated values for 2019-2021, an increase of 0.01 years and a decrease of 0.01 years, respectively. Due to the decrease in the 2019-2021 triennium (-0.30 years for men and -0.21 years for women), life expectancy at birth, in 2020-2022, for Portugal was 0.29 and 0.22 years lower than the estimated values for 2018-2020, respectively for men and women.

Figure 2. Life expectancy at birth by sex, Portugal, 1990-1992 to 2020-2022

Source: Statistics Portugal, Complete Life Tables.

In the last decade, life expectancy at birth in Portugal has increased by 1.18 years (14.2 months), an increase of 1.38 years (16.6 months) for males and 0.92 years (11.0 months) for females, when compared with the values estimated for 2010–2012. The increase in female life expectancy at birth over the last ten years resulted mainly from a reduction in mortality among those aged 60 years and over. For men, the increase in life expectancy at birth continued to be mainly due to the reduction of mortality below 60 years, particularly among those aged 35 to 59[1].

In 2020-2022, women continued to live longer than men, resuming the convergence trend in life expectancy at birth for men and women interrupted in 2019-2021. Over the past ten years, the difference in life expectancy at birth for men and women has decreased from 5.93 in 2010-2012 to 5.47 years in 2020-2022.

In 2020-2022, it was estimated that 38.0% of male live births and 57.8% of female live births will survive to age 85 if subjected, throughout their lives, to the age-specific mortality conditions observed in this period. For the period 2010-2012, these values were, respectively, 33.3% and 53.9%, for men and women[2].

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[1] Results based on the decomposition of the difference in life expectancy at birth between 2010-2012 and 2020-2022 (see technical note).

[2] Values are taken from the survival function (lx) of the life table (see technical note).
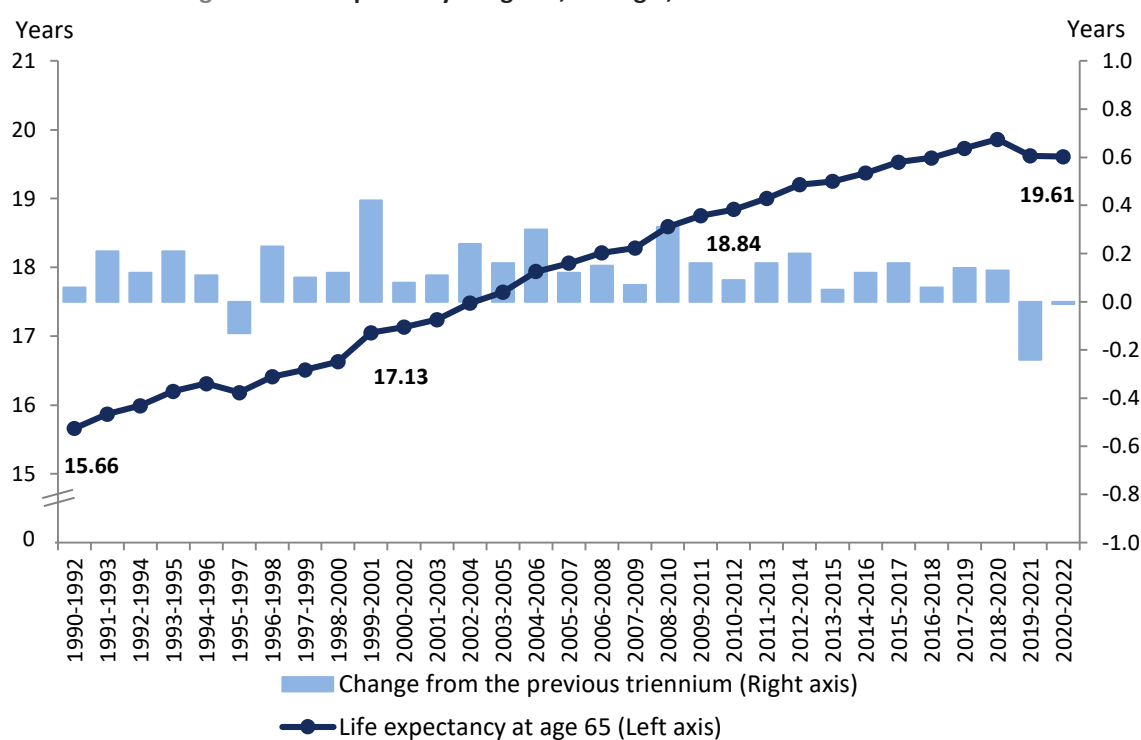
Life expectancy at age 65 of 19.61 years

In 2020-2022, life expectancy at age 65 was estimated at 19.61 years for the total population, being 17.76 years for men and 20.98 years for women, which corresponded to a decrease of 0.01 years (0.12 months) for the total population and for men, from the period 2019-2021. Life expectancy at age 65 for women did not change in 2020-2022.

In this triennium, mainly due to the reduction observed in the period 2019-2021 (-0.25 years), life expectancy at age 65 for the total population receded to values lower than those estimated for 2017-2019 (19.73 years). Life expectancy at age 65 in 2020-2022 was lower than the estimated values for 2018-2020 by 0.28 years for men and 0.21 years for women.
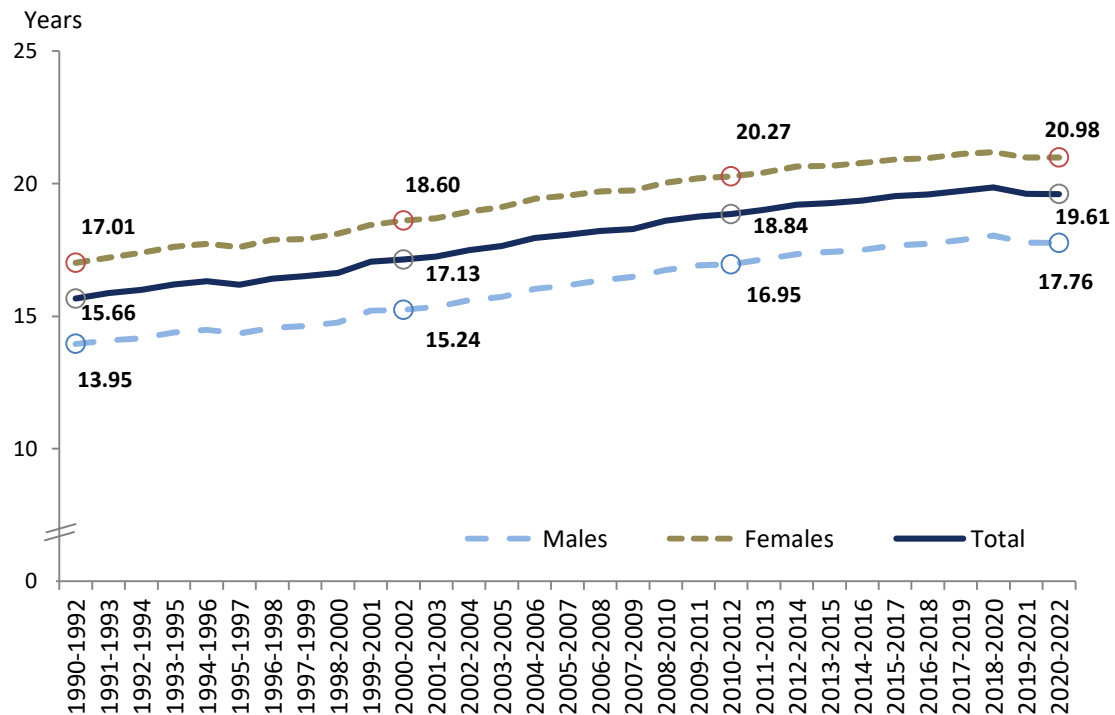
Figure 3. **Life expectancy at age 65, Portugal, 1990-1992 to 2020 – 2022**

Source: Statistics Portugal, Complete life tables.

Over the last ten years, life expectancy at age 65 has risen by 0.81 years (9.7 months) for males and by 0.71 years (8.5 months) for females. In 2020-2022 the gap in life expectancy at age 65 between men and women was 3.22 years.

Figure 4. Life expectancy at age 65 by sex, Portugal, 1990-1992 to 2020-2022

Source: Statistics Portugal, Complete life tables.

TECHNICAL NOTE

Complete life table for Portugal 2020-2022

The life table is a mathematical model of demographic analysis composed by a set of functions which provide a basis for measuring longevity in a given population and for making probabilistic judgments about the evolution of mortality with age and time. It is based on age-specific probabilities of dying estimates obtained from the observed number of deaths and the estimated population exposed to the risk of death in a given period of time, for which it is a period life table. Thus, the life table functions represent the experience of a hypothetical cohort of 100,000 live births (called the radix of the table) through their entire life under the assumption that they are subject to the observed schedule of age-specific mortality rates in a given period of time. The life table for Portugal is referred to as a complete since it contains data for every single year of age from birth to the last applicable age.

The functions of the complete life table are:

- Probability of dying (qx): Probability that a person aged x exactly will die before reaching age (x + 1);
- Survivors at exact age x (lx): Number of survivors to exact age x of the initial cohort of 100,000 live births (radix of the table);
- Deaths between the exact ages x and (x + 1) (dx): Number of the initial cohort dying between the exact ages x and (x + 1);
- Person-years lived between exact ages x and (x + 1) (Lx): Number of person-years lived by the survivors of the initial cohort between exact ages x and (x +1);
- - Person-years lived above age x (Tx): Total number of person-years lived by survivors after age x;
- - Life expectancy at age x (ex): The average number of years a person can expect to live from exact age x.

The Complete Life Table for Portugal, which is produced annually, has a reference period of 3 years. The probabilities of dying are obtained by the ratio between the number of deaths by age of individuals from two generations (defined by the year of birth) who reach that age in the three consecutive years of reference of the table and the population exposed to the risk of death of those same generations in the same period, which softens the effects on the survival function caused by atypical fluctuations in the population's mortality behaviour. More precisely, in the 2020-2022 table, when calculating the probability of dying at the exact age x, data on the number of deaths at the exact age x that occurred in 2020 from generation 2020-x (lower Lexis triangle), the total number of deaths at exact age x occurred in 2021 (Lexis square), and deaths at exact age x occurred in 2022 from generation 2022-x + 1 (upper Lexis triangle) were considered.

In the most advanced ages (over 85 years), due to the variability in the probabilities of dying at these ages, the method proposed by Denuit and Goderniaux (2005) is applied for smoothing and extrapolation to the last applicable age (closing age of the life table).

Life expectancy at birth, one of the most important longevity indicators provided by the life table, is a well-known summary measure of mortality, widely employed in comparisons through time and between populations. When analysing changes in life expectancy at birth or studying differences in life expectancy between two populations, it is useful to estimate the contributions of the various age groups that explain them. In the present exercise, the variation of life expectancy values at birth between 2010-2012 and 2020-2022 was analysed using the method proposed by Andreev, E. M., Shkolnikov, V. M., & Begun, A. (2002).

Revision of the series of complete mortality tables for Portugal 2010-2012 to 2019-2021

Following the release of the Definitive Resident Population Estimates 2011-2020 series (revised intercensal estimates based on the definitive results of the 2021 Census) and the Provisional Resident Population Estimates 2021 (first year of the new series of post-census estimates based on the results of the 2021 Census), the demographic indicators, which in their calculation include estimates of the resident population, are also recalculated. This set of indicators includes the review of the complete life tables for Portugal for the trienniums 2010-2012 to 2019-2021, as well as the revision of the 2020-2022 provisional estimate of life expectancy at age 65 indicator released in November 2022.
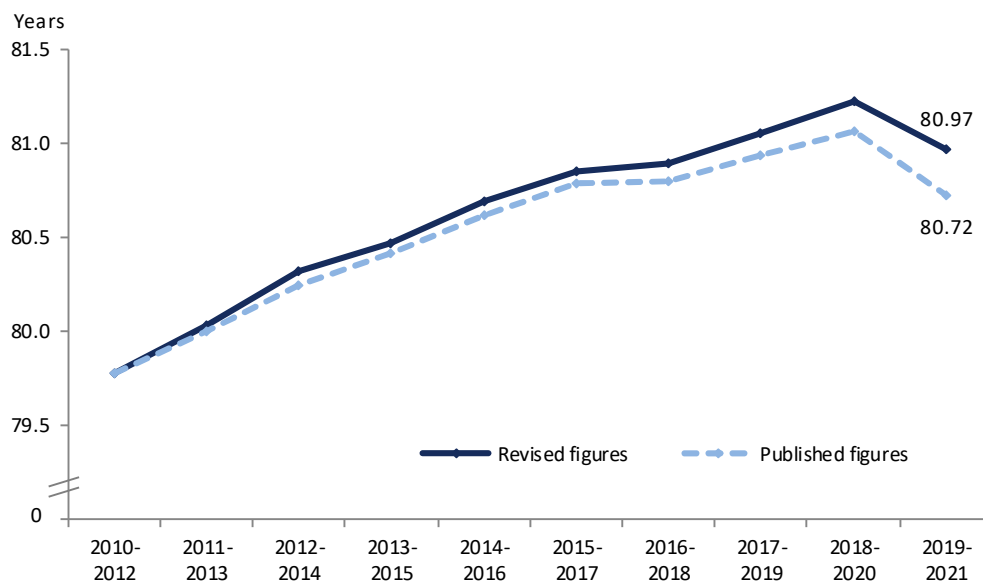
Thus, in view of the revision of the resident population estimates series for Portugal, the estimates of the population exposed to the risk of death were recalculated and the complete life tables for Portugal were reconstructed and, consequently, the indicators derived from these, namely life expectancy at birth and life expectancy at age 65. The methodology for calculating life tables for Portugal was maintained, corresponding to the methodology described above for the complete 2020-2022 life table.

As a result of the upward revision of the population exposed to the risk of death, particularly those aged over 60 years, with the observed number of deaths remaining constant, the revised values of the indicators life expectancy at birth and life expectancy at 65 years are higher than those previously reported. The differences are accentuated in the most recent periods since the weight of the most recent census information incorporated in the definitive population estimates and, consequently, in the estimates of the population exposed to the risk of death, increases as we approach the 2021 Census.

The following figures show life expectancy at birth and at age 65, revised figures and previously published figures, as well as the differences found between revised exposure to risk, that is, using definitive estimates of the resident population, and exposure to risk using provisional resident population estimates.
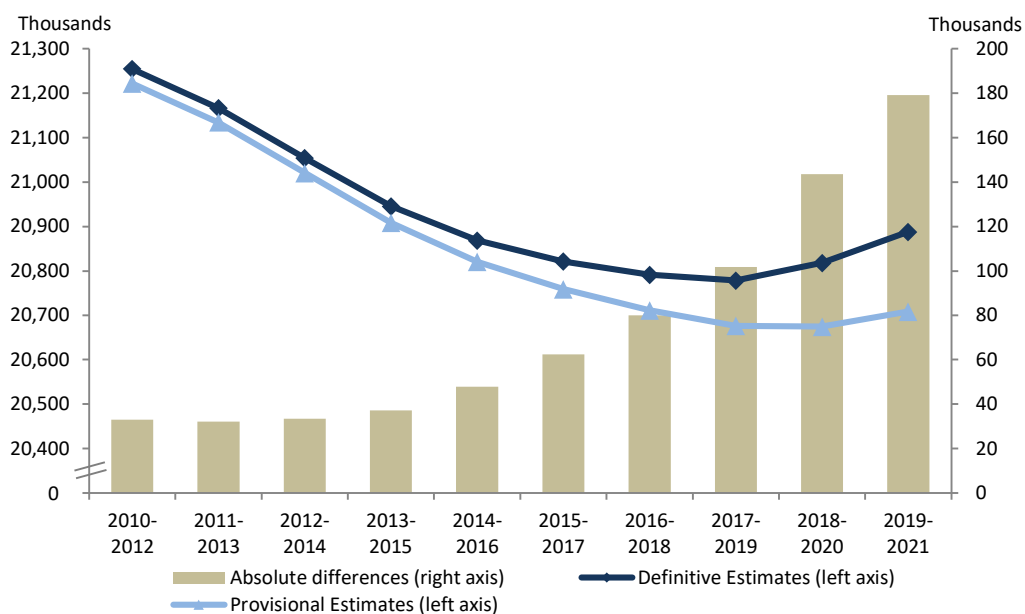
The differences found between estimates of previously released life expectancy indicators and the corresponding revised figures are, however, relatively small. In the case of life expectancy at birth for 2019-2021, the last published triennium and in which the difference is more pronounced, is 0.25 years, corresponding to 3 more months of life expectancy. For life expectancy at age 65, in the same three-year period, the difference is 0.27 years (3.24 months). The difference between the provisional figure of life expectancy at age 65 for 2020-2022, released in November 2022, of 19.30 years, and the now revised figure of 19.61, corresponds to 0.31 years, *i.e.*, 3.66 months.

Figure A. Life expectancy at birth, revised figure and previously published figures, Portugal, 2010-2012 a 2019-2021

Source: Statistics Portugal, Complete life tables.

Figure B. Definitive and provisional estimates of the population exposed to the risk of death at 0 years and absolute differences, 2010-2012 to 2019-2021

Source: Statistics Portugal, Complete life tables.

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Figure C. Life expectancy at age 65, revised figures and previously published figures, Portugal, 2010-2012 to 2020-2022
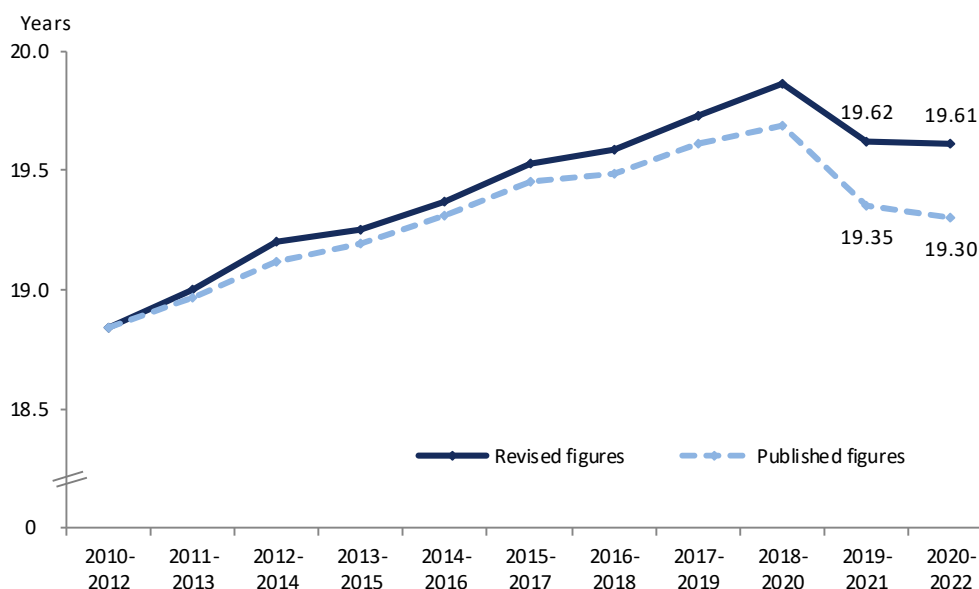

Source: Statistics Portugal, Complete life tables.

Figure D. Definitive and provisional estimates of the population exposed to the risk of death at 65 years and absolute differences, 2010-2012 to 2020-2022
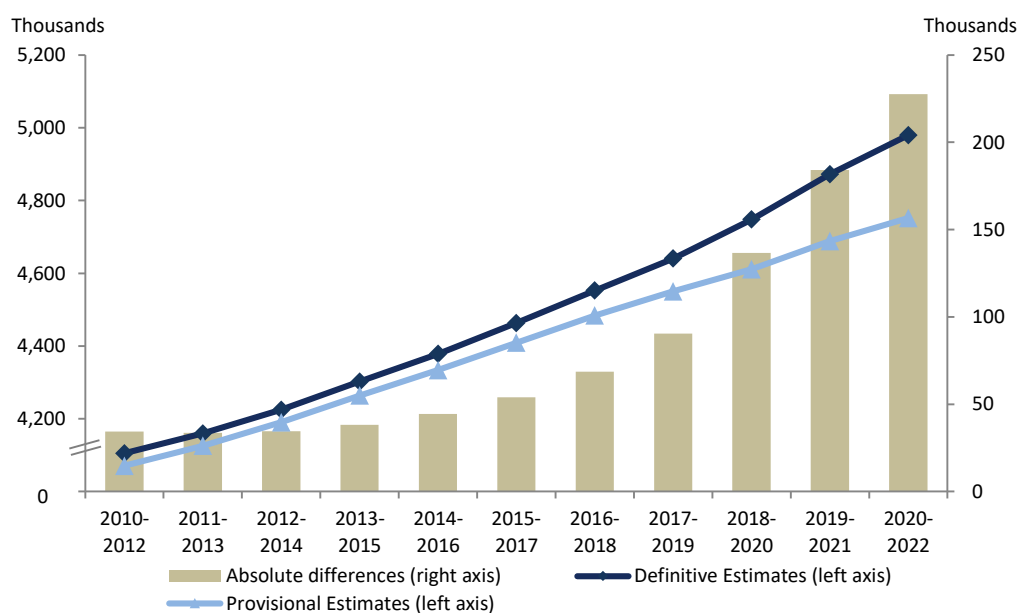

Source: Statistics Portugal, Complete life tables

Figure E. Life expectancy at birth, revised figures and previously published figures, Portugal, 2010-2012 a 2020-2022

| Triennium | life expectancy at birth (years) | | | | | |
| | Revised figures | | | Published figures | | |
	Total	Males	Females	Total	Males	Females
2010-2012	79.78	76.67	82.60	79.78	76.67	82.59
2011-2013	80.03	76.97	82.80	80.00	76.91	82.79
2012-2014	80.32	77.24	83.12	80.24	77.16	83.03
2013-2015	80.47	77.43	83.23	80.41	77.36	83.23
2014-2016	80.69	77.67	83.38	80.62	77.61	83.33
2015-2017	80.85	77.86	83.50	80.78	77.74	83.41
2016-2018	80.89	77.92	83.51	80.80	77.78	83.43
2017-2019	81.05	78.13	83.61	80.93	77.95	83.51
2018-2020	81.22	78.34	83.74	81.06	78.07	83.67
2019-2021	80.97	78.04	83.53	80.72	77.67	83.37
2020-2022	80.96	78.05	83.52	-	-	-

Source: Statistics Portugal, Complete life tables

Figure F. Life expectancy at age 65, revised figures and previously published figures, Portugal, 2010-2012 to 2020-2022

| Triennium | Life expectancy at age 65 (years) | | | | | |
| | Revised figures | | | Published figures | | |
	Total	Males	Females	Total	Males	Females
2010-2012	18.84	16.95	20.27	18.84	16.94	20.27
2011-2013	19.00	17.15	20.41	18.97	17.07	20.40
2012-2014	19.20	17.34	20.64	19.12	17.23	20.55
2013-2015	19.25	17.42	20.67	19.19	17.32	20.67
2014-2016	19.37	17.50	20.78	19.31	17.44	20.73
2015-2017	19.53	17.67	20.91	19.45	17.55	20.81
2016-2018	19.59	17.72	20.96	19.49	17.58	20.88
2017-2019	19.73	17.87	21.11	19.61	17.70	21.00
2018-2020	19.86	18.04	21.19	19.69	17.76	21.11
2019-2021	19.62	17.77	20.98	19.35	17.38	20.80
2020-2022	19.61	17.76	20.98	19.30	-	-

Source: Statistics Portugal, Complete life tables

References:

Andreev, E. M., Shkolnikov, V. M., & Begun, A. (2002). Algorithm for decomposition of differences between aggregate demographic measures and its application to life expectancies, healthy life expectancies, parity-progression ratios and total fertility rates. Demographic Research, 7, 499-522.

Denuit, M., & Goderniaux, A. C. (2005). Closing and projecting lifetables using log-linear models. Bulletin of the Swiss Association of Actuaries, 1, 29-49.

DEFINITIONS

Life expectancy at birth: The mean number of years that a new-born child can expect to live if subjected throughout his life to the current mortality conditions (age specific probabilities of dying).

Life expectancy at age 65: The mean number of years still to be lived by a person who has reached the exact age 65, if subjected throughout the rest of his life to the current age specific probabilities of dying.

Detailed methodological information available at: **www.ine.pt**, option Products, Metadata system.

Detailed statistical information available at: **www.ine.pt**, option Products, Statistical data, database, theme Population, Subtheme Mortality and life expectancy: Complete life tables, Portugal, 2020-2022.